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TITLE: Web Pricing & Ordering Service (WPOS) XML Configuration & Pricing Format (XCPF)

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1. Notice and Warning

2. Background

After solving the basic problems of an interoperable distributed environment, the business case gets more and more relevant. Therefore, the Fraunhofer ISST and the GDI NRW Testbed I & II developed the Web Pricing & Ordering Service (WPOS) and the XML Configuration & Pricing Format (XCPF). This specification covers all standard geo-eBusiness processes like pricing, ordering and online delivery for domain specific products.

Web Pricing & Ordering Service (WPOS)
XML Configuration & Pricing Format (XCPF)

Fraunhofer ISST Bericht No. 63/02
Geo-eBusiness Specification

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Dortmund

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1 Introduction

1.1 Infrastructure means building bridges

Different specialized tasks need different environments. But data exchange is essential to create higher value products. Infrastructures and therefore interoperability helps to bridge the gap between these environments (see figure 1). The lowest "bridge" in a data exchange is the common understanding of a data encoding. The data may be exchanged via FTP or email. Services are the next step, because they deliver data on-demand and with the wanted configuration.

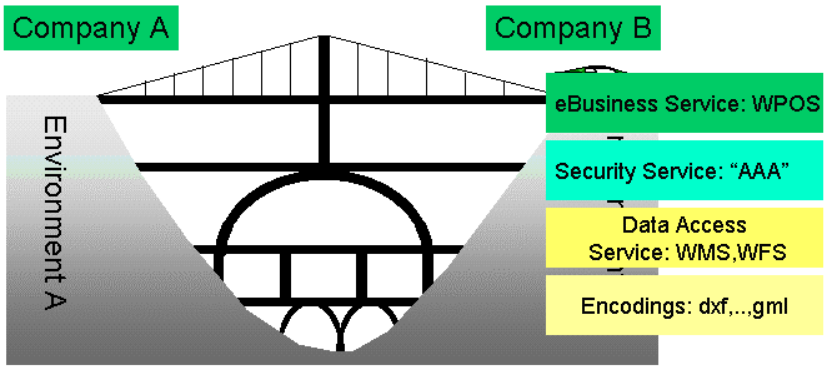


Figure 1 Bridging the environment gap

Data services are a good example for distributed applications. A well-known service is the OGC web mapping service. But how to protect the service in an interoperable mode in the case of protected data? Therefore a security service standard is required to provide authentication, authorization and access control (AAA). The next "bridge", the Geo-eBusiness bridge with the WPOS service, can close the environment gap. Pricing and ordering are the standard mechanism in the common business.
If the business level can be achieved, the infrastructure gap is closed.

1.2 Case Study: GIS meets e-Business - "GeoMarkt.NRW"

The research project of the Internet portal "GeoMarkt.NRW" was set up to investigate new technological concepts to provide professional users of geo-data products a quicker access to distributed sources.
The concrete use case and a known unsolved problem were the distributed responsibilities for cadastral geo-information products in the German state NRW. In fact, the data was located and governed in more than 50 municipalities. A good reason for an organization in that way is the importance of sustainable data maintenance for its value. Geo-data is an image of the world, which is always in change. This

organization model was very effective for local purchasers (see in figure 2 purchaser A). On the other hand, regional- or national-wide players (see in figure 2 Purchaser B and C) need permanent detailed geo-data as a basic prerequisite for their purposes, e.g. for new roads or pipe-lines. Multiple, very time consumable requests are necessary to obtain the basis data.
Different interests of the concerned data providers made it over a long time unfeasible to provide for a data distribution model acceptable to both purchaser groups .

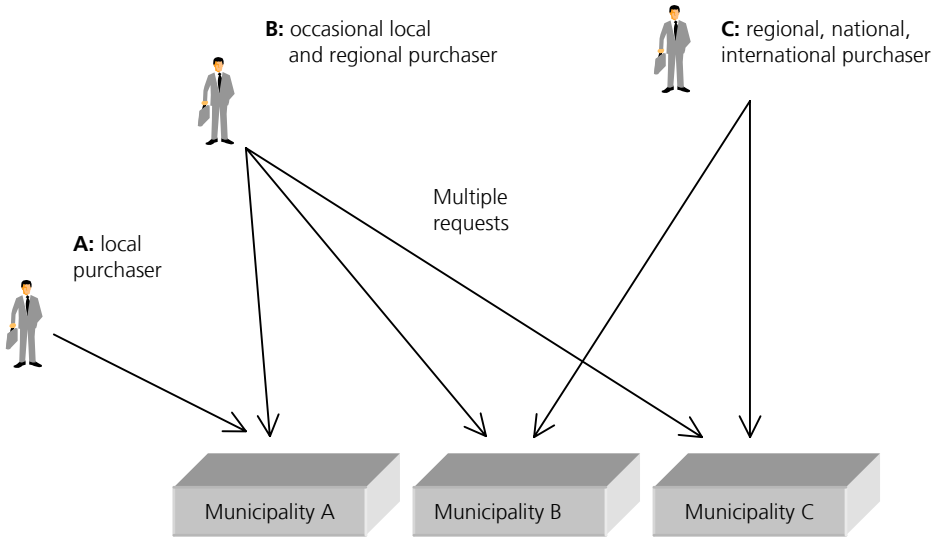


Figure 2 Purchaser groups A, B and C and their relationship to municipal data providers

But end of the nineties, it seemed that the use of new technologies could help to solve this discrepancy. With the new possibilities of the World Wide Web, the Internet can connect all local data provide to a single entry point for purchasers, called "portal". The portal offers the products with descriptions of the connected local municipalities, without a data replication mechanism. After an order is being received by the portal, the order may be divided into parts and transmitted electronically via the network to the concerned data suppliers. The local services produce the requested data and send it back to the portal.
With this electronic mechanism, the player C may not even more need to ask multiple local data supplier for multi regional data sets. Even local purchaser may not any more request their standard data electronically rather than asking directly.

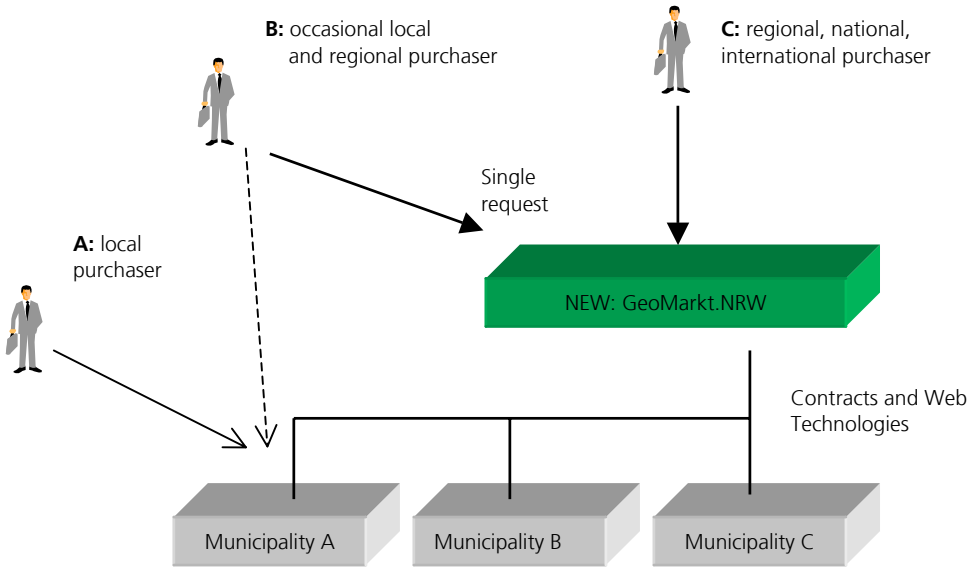


Figure 3 GeoMarkt.NRW: Efficient purchase with single request for (B) and (C) without disturbing relationships (A)

The main important technology concept to reach an optimal solution for both purchaser groups are interoperability concepts within distributed environments. The project "GeoMarkt.NRW" was an implementation proof of concept of OGC and ISO standards in a multi-tier architecture.

1.2.1 Business Model

Part of the local SDI initiative GDI NRW is the project "GeoMarkt.NRW" as a business-to-business platform for multiple suppliers and purchasers to trade geographic data and geo-services. As most inter-business e-commerce systems, the platform requires its users to register, i.e. most functions are offered to a closed, and thus highly qualified, user group. The platform supports different business models (Holtkamp, 2000):

1.2.1.1 Portal Model

Suppliers offer their products in a catalogue using ISO 19115 for the product description. The purchasers may order data via GeoMarkt.NRW. In this case, the platform will also act as a financial clearing centre. Since neither credit card payment nor electronic payment is favoured very much by German and European companies, the payment relies on purchaser accounts, which are settled periodically. The orders are transmitted to the suppliers, which deliver the data directly to the purchaser, either electronically via Internet or conventionally as a CD-ROM, or a paper map. Thus, the suppliers remain master of their data, which are not stored by GeoMarkt.NRW. Most of this transaction – information, ordering and delivery – will be based on the forthcoming corresponding OGC services in future (Holtkamp, 2000).

1.2.1.2 Procurement Model

As an extension of the portal model, the procurement model is based on a well-defined business workflow to deliver geo-data from the supplier directly to the desktop of the person in charge on purchaser side. A bank employee may, for example, receive the cadastral information he/she needs to approve a loan for a house purchase directly from a cadastral geo-data server (Holtkamp, 2000).

1.2.1.3 Integration Model

It is well known that there is a potentially huge value chain between basic geo-data and final geo-based products or services (Krek, 2000). GeoMarkt.NRW supports this value chain by a project realm: In this area purchasers can ask for services, and data supplier and/or service providers may initiate and negotiate ad-hoc consortia in order to meet the requests.

1.2.1.4 Community Model

Finally, GeoMarkt.NRW provides an information and interaction platform for the community, offering information bulletins, discussion forums and newsletters.

1.2.2 Architecture

The typical architecture for a portal like "GeoMarkt.NRW" has three or more server tiers, which consist of a user tier, a general transaction management tier and specialized services tier.
A purchaser uses a common Internet browser as a client to communicate with the system. The portal, as a server, provides the entry for every transaction for the user. It offers a unique look & feel and manages general tasks, e.g. accounts. The third tier may consist of many, distributed and different web services. The portal acts in this case as a client. These services may use other service in the 4th tier. This principle is limited by the common requirement to answer a WWW-Browser request from the first tier within 30 seconds wherein all other tiers should be requested.

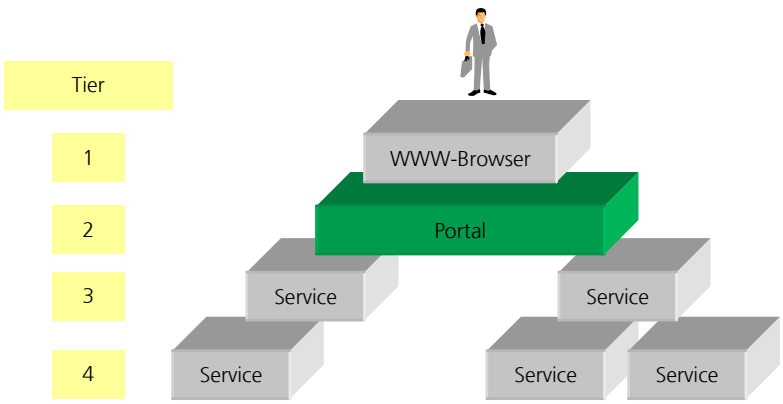


Figure 4 An abstract multi-tier architecture with on-the-fly processing through the internet

1.2.3 Functionally and Requirements

The conceptual advantages of the portal approach are evident and shown in the use case of the 50 local data-provider in Northrhine-Westfalia (NRW). But for a realization, "suitable" and accepted standards are required to achieve interoperability and to meet the necessary functionality. "Suitable" solutions have to support:

- Query mechanisms to find desired data
- Textual and graphical geo-data description
- Ordinary business transactions in this specific domain
    - Pricing models and licensing,
    - Price calculation
    - Security mechanism
    - Ordering and delivery

and

- Distributed environments principles
- Web services methods
- XML as a format for data encoding

1.2.4 Suitable Standards, Workflow and the unsolved "Gap"

Because of the event need for a geo-information retrieval mechanism, OGC, ISO and other standardization bodies, e.g. ingeoforum (InGeoForum 2000), already developed meta-data formats (e.g. ISO 19115) and a query languages (e.g. CQL) for the geo-domain. The documents and specifications cover the complete necessary functionality to describe a geo-data set, to find it and to offer further information about it and where to get the data. The OGC Web Mapping Service (WMS) implementation (OGC 1999-2002) specification can be used in a very efficient way to provide geographical navigation functions and in the case of bitmap geo-data sometimes direct data access. Some other specifications like the OGC Web Feature Service (WFS), Geographical Markup-Language (GML) or WMS with Style Layer Description (WMS SLD) specifications are offering enhanced data manipulation which meet described requirements. These standardized specifications activities are being continued.
All these developments take free data sources into account, which may be accessed online via HTTP. In the case of restricted or commercial products, the contact information is being offered, but no computer supported pricing & ordering processing. But the approach to find first a solution for free data or internal data sources was an important step in the development and it offered itself many advantages.

Form a purchaser point of view, the functionalities described in 1.2.3 can be arranged in a general workflow with five principle steps. Table 1 shows the workflow and gives an overview of the availability of suitable solutions.

Step	Workflow	Suitable solution	
I	Search for geo-data and their sources	✓	ISO 19115 Metadata ISO 19119 Metadata OGC Catalog Service OGC WRS
II	Textual and graphical information	✓	ISO 19115 Metadata OGC WMS
III	Pricing and ordering	⊘	Attention: INTEROPERABILITY TRAP
IV	Security mechanisms for Authentication, Authorization, Access Control (AAA)	⊘	Attention: INTEROPERABILITY TRAP
V	Geo-data production and manipulation, e.g. integration or transformation	✓	OGC WFS, OGC WMS SLD, OGC WTS

Table 1 General trading workflow in steps and availability of solutions in distributed web environment

The domain standardization bodies do not provide a suitable solution for the workflow steps III, pricing & ordering, and IV, security. Table 1 visualizes the "gap" in a business case.
Figure 5 analyzes the circumstance from an architectural point of view. The functionality of workflow steps I and II can be covered by the "Metadata" component. The workflow step V can be covered by the "Geo-data" component. This figure visualizes the needed e-commerce component (Eco) as a technical solution for the workflow steps III and IV, which should be designed along the principles of the other two components.

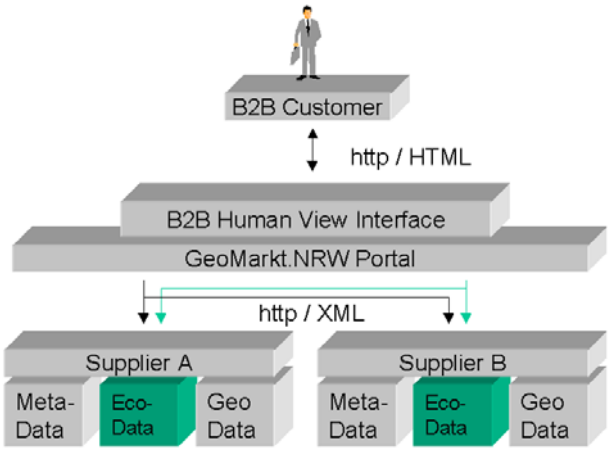


Figure 5 Three-tier-architecture with Metadata Catalogue, E-Commerce Data and OGC Data services and two data provider

1.3 Open Questions

Although specifications are available for meta-data and geo-data formats and meta-data catalog and geo-data services, OGC provides a technique, which may be also employed for a specification for pricing and ordering aspects. Along the OGC and general web service technique, the solution should consist of a data format for geographical price-models and methods to calculate a price and to start an order process.

1.3.1.1 How to Design an Machine-Readable Data Format for Geo-Domain Specific Business Price Models?

The calculation of a price may sound simple in the case of tailored mass products like books or wine bottles. Modern geo-services provide a wide range of possible product configurations. Because geo-data is extreme costly in Europe and elsewhere, the wide range of possible product configurations are strongly interdependent closely related to therefore resulting complex price models.
The solution of the open question of the data format should be able to cover the wide range of today-used pricing models. Some examples are described in detail as use-cases in chapter 4.1.

1.3.1.2 Which Interface Functions are needed for Pricing and Ordering?

Other open questions are procedures, which operate on the price model data formats and other data sources like purchaser databases. Typical procedures are product and licensing information, price information, and order forms for purchaser address and billing data, receipts and bill of delivery. But are these typical procedures sufficient for the wide range of pricing models?

1.3.1.3 How to embed the new Components into the existing OGC/ISO Workflow?

A possible solution should enhance the general workflow, but therefore it needs to tie up to already released standards. The first approach of OGC/ISO workflow covered the runtime main procedures "search" and "access" of free geo-data as described above. The metadata standard ISO 19115 already identified the business case "ordering" and provides a simple, not machine-readable unit for this purpose shown in table 2. But the class was not designed to cover a computer supported ordering, because of the uncertain free character strings.

B.2.10.5 Standard order process information

298.	MD_StandardOrderProcess	StanOrdProc	common ways in which the resource may be obtained or received, and related instructions and fee information	Use obligation/condition from referencing object	Use maximum occurrence from referencing object	Aggregated Class (MD_Distributor)	Lines 299-30
299.	fees	resFees	fees and terms for retrieving the resource. Include monetary units (as specified in ISO 4217)	O	1	CharacterString	Free text
300.	plannedAvailableDateTime	planAvDtTm	date and time when the dataset will be available	O	1	Class	DateTime (B
301.	orderingInstructions	ordInstr	general instructions, terms and services provided by the distributor	O	1	CharacterString	Free text
302.	turnaround	ordTurn	typical turnaround time for the filling of an order	O	1	CharacterString	Free text

Table 2 ISO 19115 extracted Unit MD_StandardOrderProcess

1.3.1.4 How to Embed Pricing and Ordering Functions into cascaded Architectures?

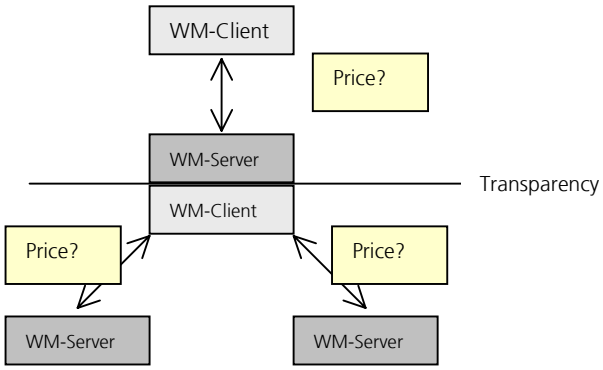


Figure 6 Example of an cascaded OGC Web Mapping Service Architecture

The integration of geo-data is the most important topic for OGC interoperability activities. Modern architectures providing the mechanism of hierarchical "cascaded"

chaining of similar services. Figure 6 gives an example of the famous Web Mapping Service.
How to find a solution, which will be implementations-independent by principle to conserve the advantages of using protocol-conform products?

1.3.2 Product and Service Description

The common workflow of e-Commerce Systems contains product description as the first step. In the GIT world the product description is called "metadata" data, which describes the geo-referenced data. This kind of data is important in the case of searching geo-data by using catalogues. There are several approaches do define a semantic and to provide a digital data representation. The most important today is the new ISO 19115 standard, which is widely accepted. This metadata standard describes all necessary topics about a geo-data set or in the case of geo-eBusiness about the product geo-data. Therefore, there is no need to start describing the product, rather to use this standard.
Similar to description of content with the ISO 19115, the ISO 19119 describes the web service and its properties. With these standards, the product "geo-data" can be searched and found in catalogues.

1.3.3 Security (AAA)

A geo-eBusiness Service calculates prices, receives orders and delivers. Typically for commerce a certain level of security is necessary for these transactions. But that does not means that a geo-eBusiness service development need to provide proprietary security mechanism rather than using known and accepted standards (See step IV in table 1).
Authentication, Authorization and Access-Control (AAA)-Services are needed for many tasked where data is not free or should only be accessible to a certain group. There are some approaches to define this AAA Services in detail.
The AAA should also provide a simple purchaser database, where address and login data is being stored.

2 Motivation and Benefits

Today's pricing mechanisms for geo-referenced data are much more complex than for other common goods, e.g. books.

- Geo-data services have the ability do generate a product with a wide range of configurations.
- Geo-data is costly to acquire and need permanent updating. Therefore, geo-data is very expensive.

These characteristics conduct to complex pricing models.

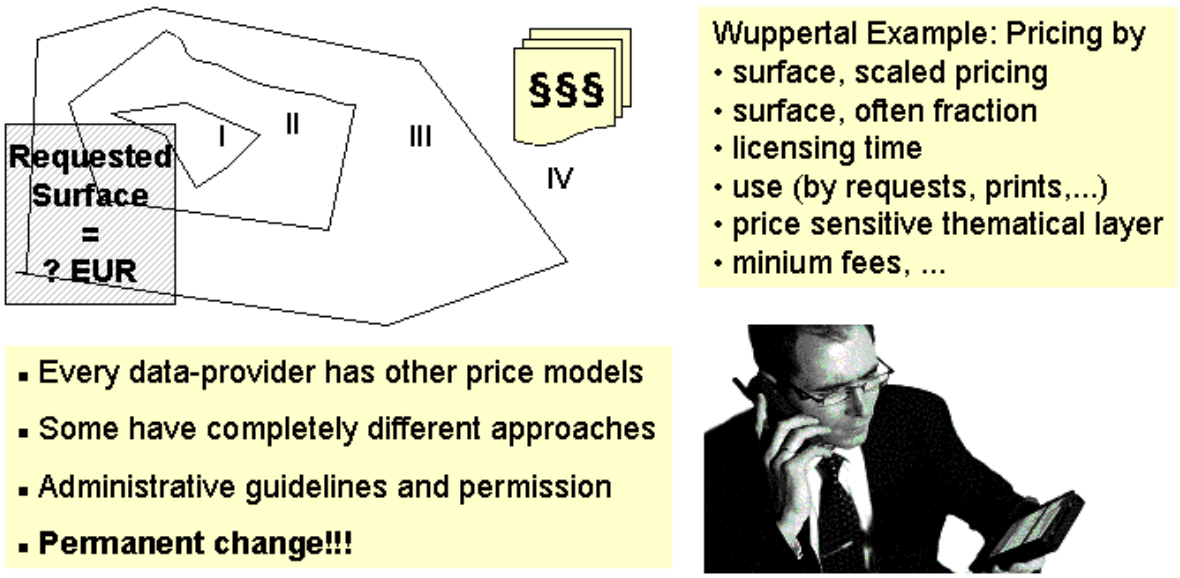


Figure 7 Presentation extract of a complex pricing approach

Figure 7 shows as a use case the "zone pricing" approach. The price depends on the covered areas in different pricing zones I-IV. But the price depends as well on more factors.
There are several different pricing approaches on the market and there is a permanent change, because of general adjustments like inflation, but as well with new pricing formulas, e.g. special offers.

But if an encoding for the complex pricing models could be developed, a standardized interface released and a suitable embedding is provided, some major benefits can be used. Figure 8 shows the wide range of possible use of a Web Pricing & Ordering Service.

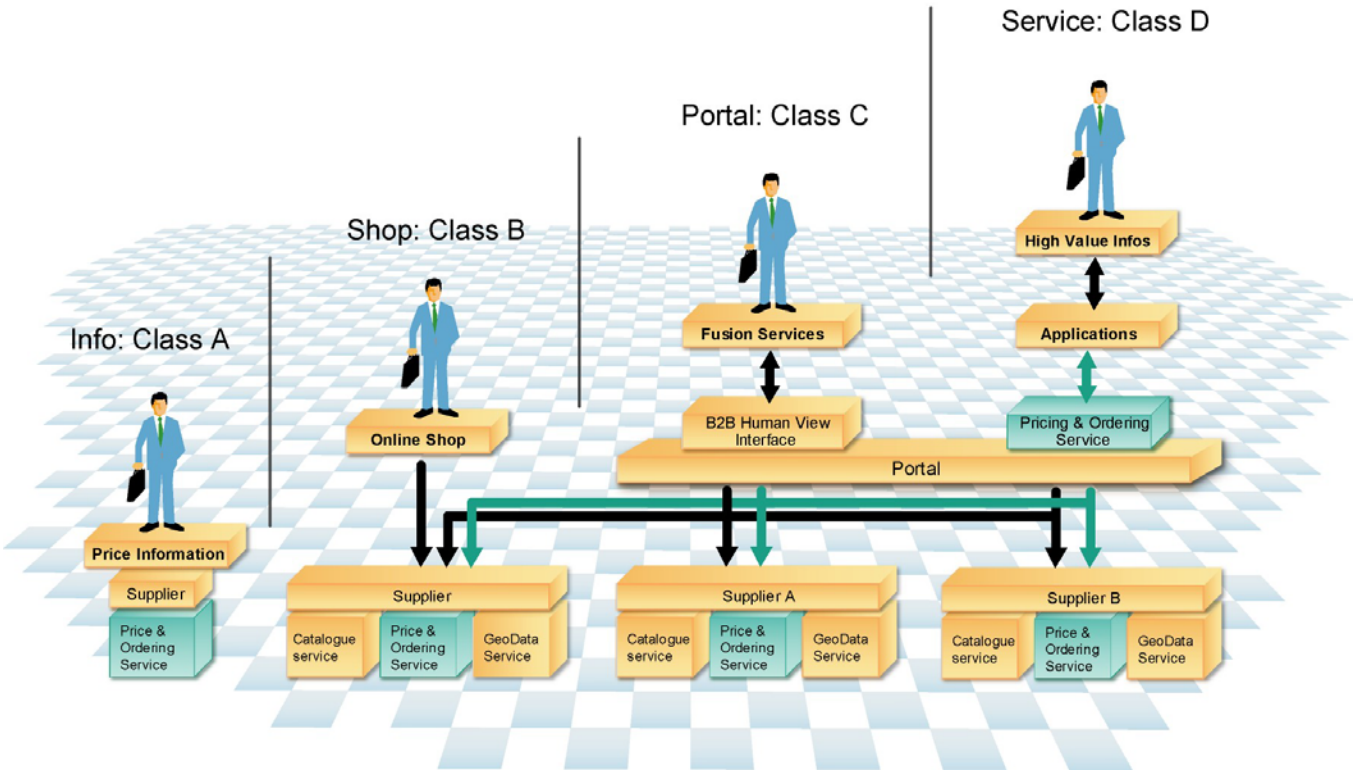


Figure 8 Classification of Geo-eBusiness

2.1 Class A: Pricing Information

The use as class A provides a quick internal or external pricing information system 24h/7d even for complex models. This applications does not need any integration with other services and supports on-line ordering with off-line delivery.

2.2 Class B: Shop

The shop contains a Catalog Service to query the ISO 19115 meta data entries, a WPOS and some geo-data services. This class has the same characteristics but includes online delivery

2.3 Class C: Portal

An interoperable e-Business protocol like WPOS is necessary to set up a distributed portal efficiently. The portal can integrate transparent or not transparent multiple data provider and supporting search, pricing, ordering and delivery. Enhanced portals may provide geo-data integration services, which may include transformation and conversion services.

2.4 Class D: Vertical Value Chain

This class supports an electronic vertical value chain with cascaded WPOS services. The electronic procurement of geo-data as raw material offers data delivery "on-demand" and possibly "on-the-fly". This class needs essentially an interoperable eBusiness standard.

3 Geo-eBusiness Service: WPOS/XCPF Specification

In a research and development process, solutions are being created on different abstraction levels. Fundamental principles have a deep impact in a solution and may be difficult to change afterwards. The applied design can be derived from abstract principles. Therefore abstract and applied designs are presented separately in this document.

3.1 Abstract Design

This paragraph covers the fundamental abstract principles for the design of the pricing data model, for the functionality and for the embedding into the already existing environment.

3.1.1 Abstract Architecture Principles

3.1.1.1 Separation between Data and Logic

Separation of data and logic in principle is the fundamental idea in this design. This approach is more difficult to design and to implement, but offers far-reaching advantages. The same software can handle complety different price models. Different data providers may use the same software instance or an own instance for their needs. The adjustment of prices can be easily realized without any operation in software code, which requires advanced knowledge and permissions. The advantages are evident, but the design much more challenging.

3.1.1.2 Service Cascading and general Chaining

An often-used mechanism to integrate data streams is the cascading of services. The abstract protocol principle of WPOS uses a protocol layer technology, which supports cascading. Therefore the often used cascading is possible with the same geo-data protocol.

3.1.2 Abstract Data Model and Encoding

3.1.2.1 Transformation Business Pricing Models into mathematical Formulae

Pricing models are designed to provide a customer with a transparent way to determine a price. Today, most pricing models are being published digitally, but with an uncertain semantic. Conditions are being often described by using words. The semantics of this kind of information representation has to be interpreted by humans and it depends on a subjective point of view.
There are several real-world examples, showing misinterpretation of a public pricing formula even among colleagues. Because of the wide range of pricing models with complete different approaches, only a generic presentation can be used.
The smallest common denominator to cover these requirements in a case of a pricing formula is the mathematical formula. Therefore these steps are necessary:

- Principle: First core pricing elements, then secondary elements like "update" elements
- Declaration of variables and their units
- Successive transformation of human readable business pricing model into a mathematical formula

As experience shows, that almost all business pricing models can be transformed into mathematical formulae. The result can be a set of hand written formulae.
This first step cannot be supported by computer procedures.

3.1.2.2 "Filling the receipt"-Concept and XCPF Methods

Data models may have several views depending on use. Views have the advantage to select relevant data. The disadvantages of several views are several tool-sets. The XCPF design is a trade-off of both.
The general idea of the XCPF design is to use a template of a complete receipt as a price model, which can be filled partly by each WPOS step. The XCPF object-oriented methods are very close to the WPOS methods. A prefix "xcpf" marks the object-orientated difference.

- The xcpf**getPriceModel** method creates an instance of the XCPF catalog and selects the requested products pricing models up to the XCPF root knot "xcpfEnvelope".
- The xcpf**getPrice** method sets the user given parameter values, calculates the formulae and stores the interim results in each hierarchical level up to the XCPF root knot.
- The xcpf**orderProduct** method stores the customer relevant data, e.g. address, status and transaction number into the selected XCPF instance.
- The xcpf**getOrderList** method returns a valid XCPF structure, but with a list of defined former customer orders.

After a valid and complete workflow the instance can be stored with all contract and interim results for documentation at the customer client site as a result of the WPOS response "OrderProduct" and at the supplier site.

There are more XCPF methods for calculation, mapping and administration, which are implementation dependent and will be discussed in the applied approach paragraph.

3.1.2.3 Organization of Products in Groups and Catalogues

Some suppliers provide a large number of possible products. Therefore it is suitable to organize products in hierarchical product families or product-groups. There is an open number of point of views to arrange products in groups and finally in catalogues. The "productGroup" Objects can be recursive.

3.1.2.4 "Product" Elements and the Basic XCPF Process

The main price-able unit in an order process is a single "product" object. It can offer a complete price calculation result. This mechanism is called the "*Basic XCPF Process*". The object and its process is independent and can only be triggered from outside by configuration parameter settings and XCPF-WSC. The output result is most often a price, which corresponds to a meta data entries and therefore to a business product. Different measurement units may cause incorrect calculation and with it incorrect business offers. Therefore each parameter must have an unit entry. Especially in the cascading use with different WPOS instances from independent suppliers, different currencies may occur.

3.1.2.5 "ProductGroup" Elements and the Hierarchical XCPF Process

The "product" object ability of calculation is sufficient to provide a price for a single product. Price may differ depending on special constellations between instances of "product" objects. More common reasons are minimum fees, which may apply only for special product groups.

XCPF offers a mechanism, the "*Hierarchical XCPF Process*", which enables enhanced pricing on "productGroup" object level depending on multiple results from "product " object level. The results may be prices, but may as well surfaces areas or other measurement units. The solution is a workflow, which first calculates sequential the leaf elements "product" sequentially. The results are being stored in parameter sub objects of each product object. After a calculation at "product" object level, the results may be referenced by a "productGroup" calculation formula. There are two reference methods:

- Single-referenced parameter, which reference by product ID to a determined value of a determined parameter name
- Multiple-referenced parameter, which reference to a list of all parameter on "product" object level with the same name

A default example is the summation of prices in each "productGroup" level for an interim price of all selected product items. Group calculations may summarize interim prices form lower groups. The final result of all calculations is being stored in the root calculation object on xcpfEnvelope level.

3.1.2.6 Inheritance Methods and the Inheritance XCPF Process

In the case of a large supplier, many thousands of products have a price model. In fact, in most pricing models are often series or recurrent entries like contract information. To avoid data redundancy and offer more efficient administration capabilities the XCPF inheritance mechanism was developed.
Most often used objects may be inherited once on a certain hierarchical product group level. These objects will be inherited at runtime to all lower "productGroup" levels and finally to the "product" level.
There are two possibly methods to change an inheritance:

1. Overwriting be new inheritance within the inheritance tag
2. Overwriting by a regular object at a regular position

A new object in the inheritance (1) environment will be inherited to child objects. The second (2) overwriting will only override an inheritance at the given position.
The Inheritance XCPF Process runs prior the other XCPF processes to set-up at a valid XCPF environment first. The inheritance will be invoked at the xcpfCatalog level and completed through all lower levels.

3.1.2.7 Order of XCPF Processes

Calculation processes at "product" object level, calculation on "productGroup" level and optimization by inheritance need a certain order, which depends on the request:

1. Inheritance XCPF Process
2. Basic Calculation XCPF Process
3. Hierarchical Calculation XCPF Process

From a more general point of view, the manipulation starts at the XML Document root with the highest inheritance level down to the leafs. And then back via setting of configuration parameter-values and to the root with the calculation hierarchy. Table 3 gives an overview together with WPOS methods.

	XCPF Methods		
WPOS Methods	Inheritance Process	Basic Process	Hierarchical Process
GetCapabilities	-	-	-
GetPriceModel	1	-	-
GetPrice	1	2	3
OrderProduct	1	2	3
GetProduct	-	-	-
GetOrderList	-	-	-

Table 3 The matrix shows the XCPF process methods in relationship to WPOS methods.

3.1.2.8 External Data Exchange

There are some reasons that price formulae may depend on external data. For example, a price can only be calculated, if some parameters

- are depending on mass storage filtering, e.g. pricing by number of objects.
- need sumptuous sub procedures, e.g. calculation of surface, which may depend on different co-ordinate systems
- Actual values, e.g. stokes or interests
- other…

Solutions for these external requests are embedded Web Service calls, with a set of output parameters and a set of input parameters. They will be called in the XCPF encoding "XCPF Web Service Calls (XCPF-WSC)". Due to time-outs, it is required, that an external process should be done "on-the-fly". The uses of web service for external data exchange are required, because of the wanted nomadism of XCPF instances.

3.1.2.9 Nomadism of XCPF instances

Pricing Models should be in general transparent to anonymous customers. This is a main reason for the WPOS function "GetPriceModel". A selected instance of a XCPF price model may be used as well on different WPOS instances. A reason might be optimization for lower costs. Nomadism is possible, because of the principle of separation between data and logic, encoding with platform independent XML and the use of XCPF Web Service Calls (XCPF-WSC).

3.1.3 Abstract Functionality Principles

3.1.3.1 Functionality

The content of this document was developed to close the "gap" in a business use case between the search and retrieval functions of a meta-information system (MIS) and the geo-data generation functionalities. This "gap" was described in detail in chapter 2. Therefore a typical business workflow needs functions for offer all configuration capabilities, pricing and contract information for each product. There return value is the product specific price model.
With these information elements, a purchaser is able to configure a product and to calculate a price with its own calculator.
A more enhanced functionality is to offer a method to calculate a price by a service. In a case of a geo-data protocol, there might be the question: "How much would the result of this specific geo-data request cost?" The return value is a price.
The business act of an order is technical very similar to a price calculation, but adds purchaser accounting information and is from a business point of view a signing of a contract with all possible consequences.
The characteristic of most modern digital geo-products is, that they can be represented completely as digital data. This circumstance of a special e-commerce product opens the perspective to delivery the desired product online via the Internet.
An optional functionality might be a method to track all orders with all attributes, e.g. price and a status, e.g. ready for delivery or error.
There are some more additional sub workflow needed like for security reasons. But the principle functionality can be defined in following methods:

Functionality	Short description
Get Capabilities	Delivers a complete list of all available products
Get Price Model	Delivers all configuration and price information
Get Price	Price calculation as a business offer
Order Product	Ordering
Get Products	Delivery
Get Order List	Accounting

Table 4 Necessary functionality for a business workflow

These methods offer all needed functionally for a complete business workflow. The functionality need to be defined and mapped to WPOS methods, which are protocol dependent.

3.1.3.2 Business Protocols vs. technical Protocols

Each protocol enables applications to exchange information within the protocol specification, which works pretty fine in the designed scope. Using this ability,

cascading systems can merge information from distributed sources in a very elegant way. A well-known example is the cascading OGC Web Map Service using free data sources (See figure 9).

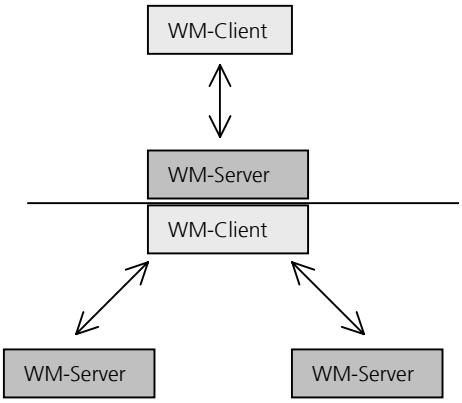


Figure 9 Cascading Architecture with free sources

But it is not possible to enable these technical protocols covering business aspects while transferring value data across company borders. A Web Map client can only understand a Web Map server. Using some additional "vendor specific" parameters to transmit business aspects, which are specified, makes a solution dependent on implementation instances. It may work with a cascading Web Map Server product of company "A" but not with another.

3.1.3.3 Protocol Layering Method

In the following paragraph, a technical service is a service, which has the ability to handle sector specific formats and may merge information. A business service is a service, which covers transaction aspects like price, ordering and delivery. The OGC Web Map Server (WMS) is a good example for a technical service. The Web Pricing & Ordering Service (WPOS) is an example for a business service.

A solution to disentangle technical and business data streams is by introducing the method of protocol tier models (See Figure 10). A tier covers its specific aspects, encodes and packs the lower protocol into its tier data stream from the client to the server.

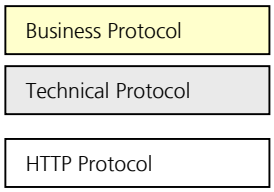


Figure 10 Protocol Tiers

A solution to solve the situation of already defined technical specifications in a general manner is by emulating a technical service. The connection between a web client and a service are defined by a URL, which has to be configured. This is the only general parameter to get involved into the technical data stream. In the business case the technical target URL of its server is being reconfigured to an emulating business client. The business client accepts the request and the parameter list. The technical request can be analysed, encoded and packed into the business protocol. The business request can contain all necessary transaction parameters. In the following step the business client requests the business server.

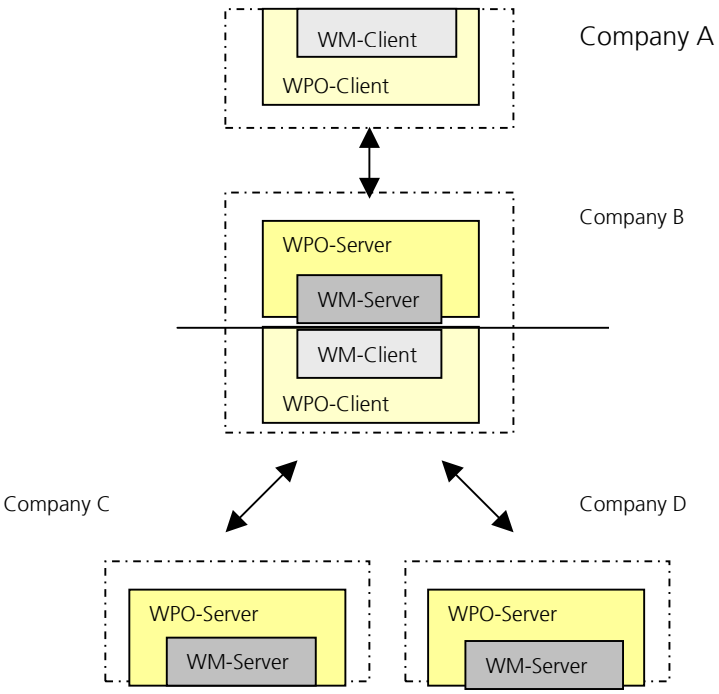


Figure 11 Cascading example Architecture with a Web Mapping (WM-) Service as technical Service and the Web Pricing & Ordering (WPO-) Service as a business Service

The business server unpacks the technical request, decodes the technical request and sends it to the target technical server. The technical server has the abilities to create the requested data for the technical client. This data stream will be routed back via the business protocol and presented to the technical client as requested. All transactions may be tracked and analysed for further accounting within the business tier. Figure 11 shows this mechanism also working in a cascading way. This general approach can be used to cover business aspects without interfering the data stream between specialised technical services.

.

3.2 Applied Design

3.2.1 Applied Data Encoding: XML Configuration & Pricing Format (XCPF)

The name "XML Configuration & Pricing Format" for the applied data model was chosen to show, that a data-set

- is based on a XML structure
- contains all capabilities for a (geo)-products, which should be configured by customer
- covers the pricing aspect, which is often very close to the configuration.

3.2.1.1 XCPF Object "Product"

This Object is an important structure and is the smallest unit, which contains a complete calculation environment. This "product" object corresponds with its ID directly to a data product and to its metadata. A "product" object has, in the sense of the XCPF main axis, no child-elements.

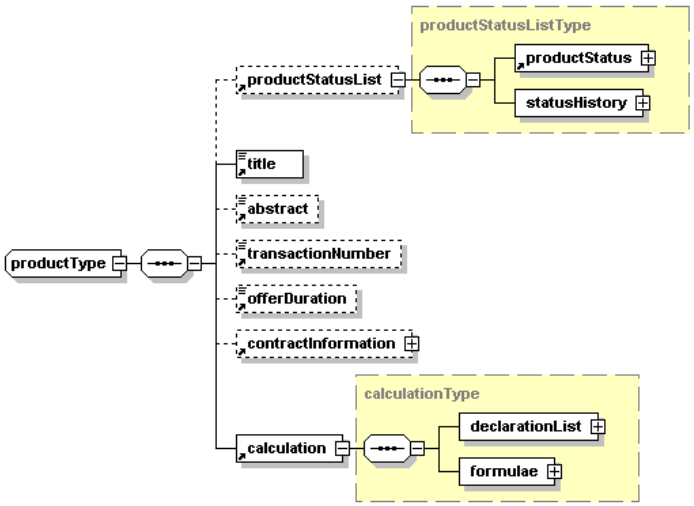


Figure 12 XCPF "product" Element

A WPOS instance can use a XCPF pricing model instance to store order process information into the status list. Each "productGroup" may have a title, but each product must have a title to allow a user a better understanding. An abstracts may be used to give some more background information about the product. But the complete product description may be made in an ISO19115 description and referenced by a "productId".

The field "transactionNumber" (TAN) contains an ID, which is needed the stateless WPOS transactions. There are three ways to implement the workflow for this field:

1. TAN in the "product" object corresponds to a single ordered product
2. TAN in "productGroup" object corresponds to all entries in a order session
3. TANs in both fields

In the first case, each product data file can be downloaded separately with an own TAN. The second case offers to download a compressed data file, e.g. with zip. Some clients can use the second variant as an accounting mechanism for an ordered shopping cart. The third case offers both possibilities for a user.
The tag "offerDuration" contains a valid timeframe for that offer. Orders can be processed under curtain circumstances, which must be declared in a contract object, which is described in 5.2.2.2. The calculation object has the abilities to calculate a result.

3.2.1.2 XCPF Object "contractInformation"

Trade needs agreed rules, which are defined here as contract information. The contact information of the supplier is transparent. The customer's contact information needs to be added for a valid WPOS "OrderProduct" request. The customer object contains the same entries as for the supplier, but may use more address objects for delivery and accounting.

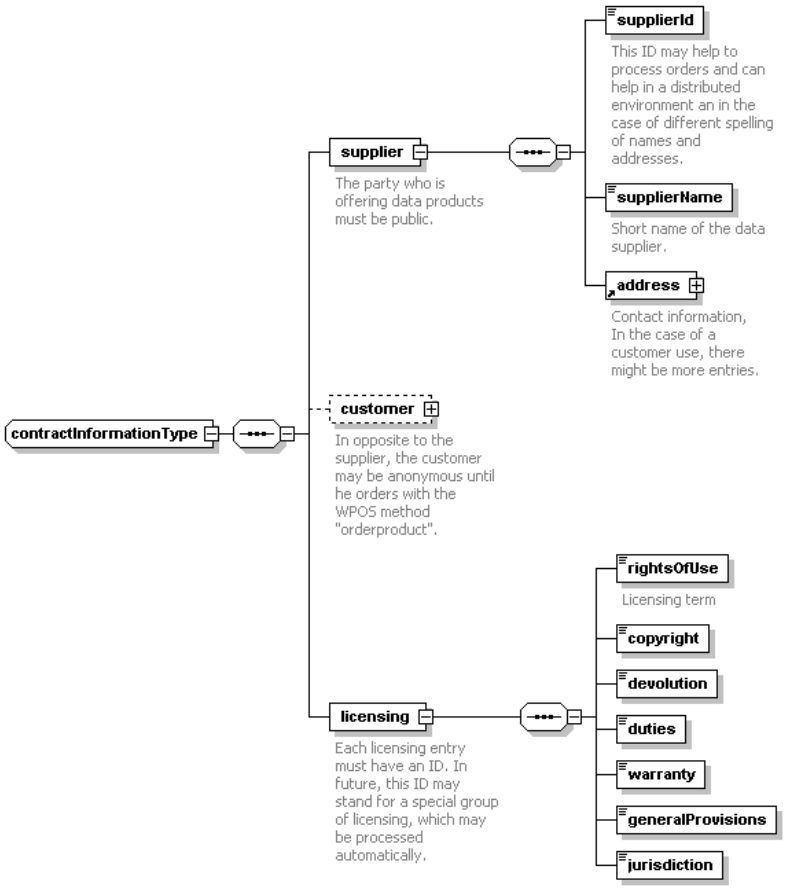


Figure 13 XCPF object “contactInformation”

3.2.1.3 XCPF Object “Calculation”

A “calculation” object contains all engine-readable information to determine a price with a user input for the configuration. This object is used in a “product” and in a “productGroup” environment. Because of rebates, taxes or other pricing mechanisms, pricing models can be adjusted with a formula on each hierarchical step of the pricing catalogue.

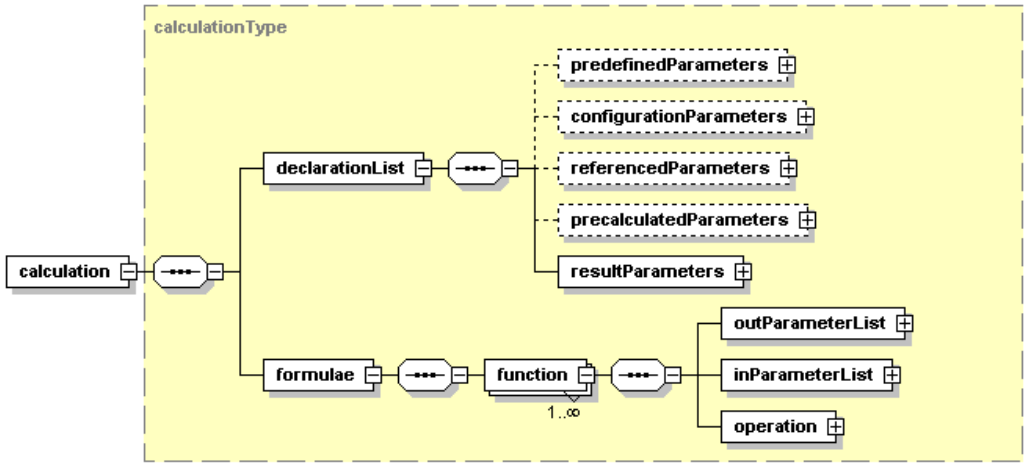


Figure 14 XCPF object “calculation”

All parameters need to be declared prior calculation. The front-office input and output workflows can be determined by using categories. Some parameters are necessary for the processing, but are constant, e.g. tax. These parameters can be declared as "predefined". Other parameter values need to be set first by user. These parameters are called “configurationParameters”. All these parameters will be visualized in a WPOS client. Some of these may be used for pricing, e.g. Contract time, other may be used for data generation, e.g. style=red and some for both, e.g. data format= dxf.
Referenced parameters can only be used in “productGroup” environments, because they are needed for hierarchical calculations, where parameter values of previous calculated values can be accessed. An often used example is the sum, where in previous prices are summarized.
The “precalculated” parameters are being used to store the results of sub functions. These functions may be mathematical operations or XCPF Web Service Calls (XCPF-WSC) and have only values at runtime. The XCPF-WSC are useful for access to mass storage, for complex calculations or for actual data. They are results of functions.
An often-used example is the calculation of a surface of a polygon. The mandatory “resultParameter” contains the parameter for the final result of all calculations. The

parameter object is described at 3.9. All parameters may be used in “functions”. A function has output and input parameter and delivers a result value. The possible operation types are described in the next paragraph.

3.2.1.4 XCPF Object “parameter”

The parameter object is the basic element for each calculation. Each parameter has a logical name and for language reasons, several different descriptions. These descriptions may use white spaces and can contain sentences. Typically some parameters may be used as groups for some reasons. Equal strings in the “variableGroup” field will express the group relationship. The same parameter may belong to more groups, e.g. for "pricing" and for generation "geoserver". An example is the use of a set of parameters for data generation. All parameters should contain in the “variableGroup” the same string, e.g. "geoserver". All the parameters with the same string may be filtered and transferred to geo data generation server.

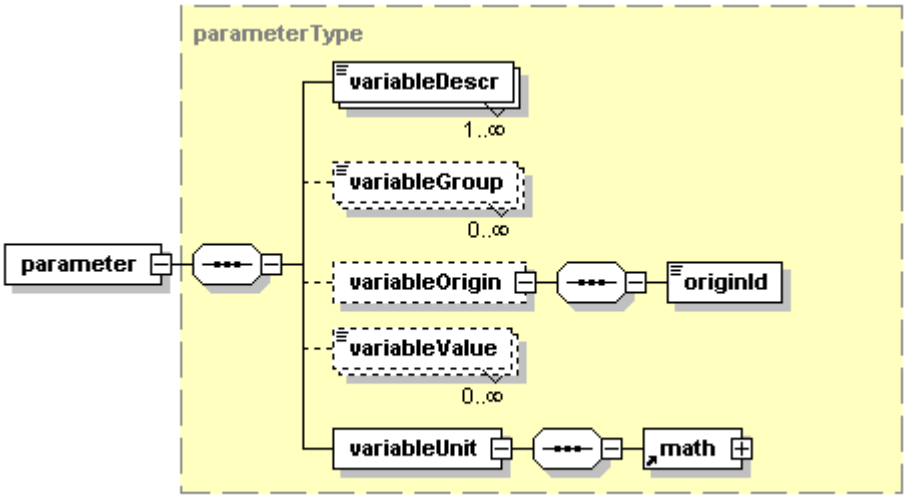


Figure 15 XCPF “object parameter”

NOTE: “Variable Origin” will only be used in "referencedParameters" objects. The required attribute "orginName" contains the original name of a low hierarchical parameter. Referenced parameter can be used in to ways as

- Multiple references with lists of parameter values
- Single references

An often used multiple examples are the price calculation, which refer to the list of all previous results. Multiple references need a "*" as a wildcard to access all parameter values with the same name, not depending on product entries.

3.2.1.5 XCPF Object “operation”

There are two possible operations to achieve results with a list of output and input parameters: mathematical formulae and external XCPF Web Service Call (XCPF WSC).

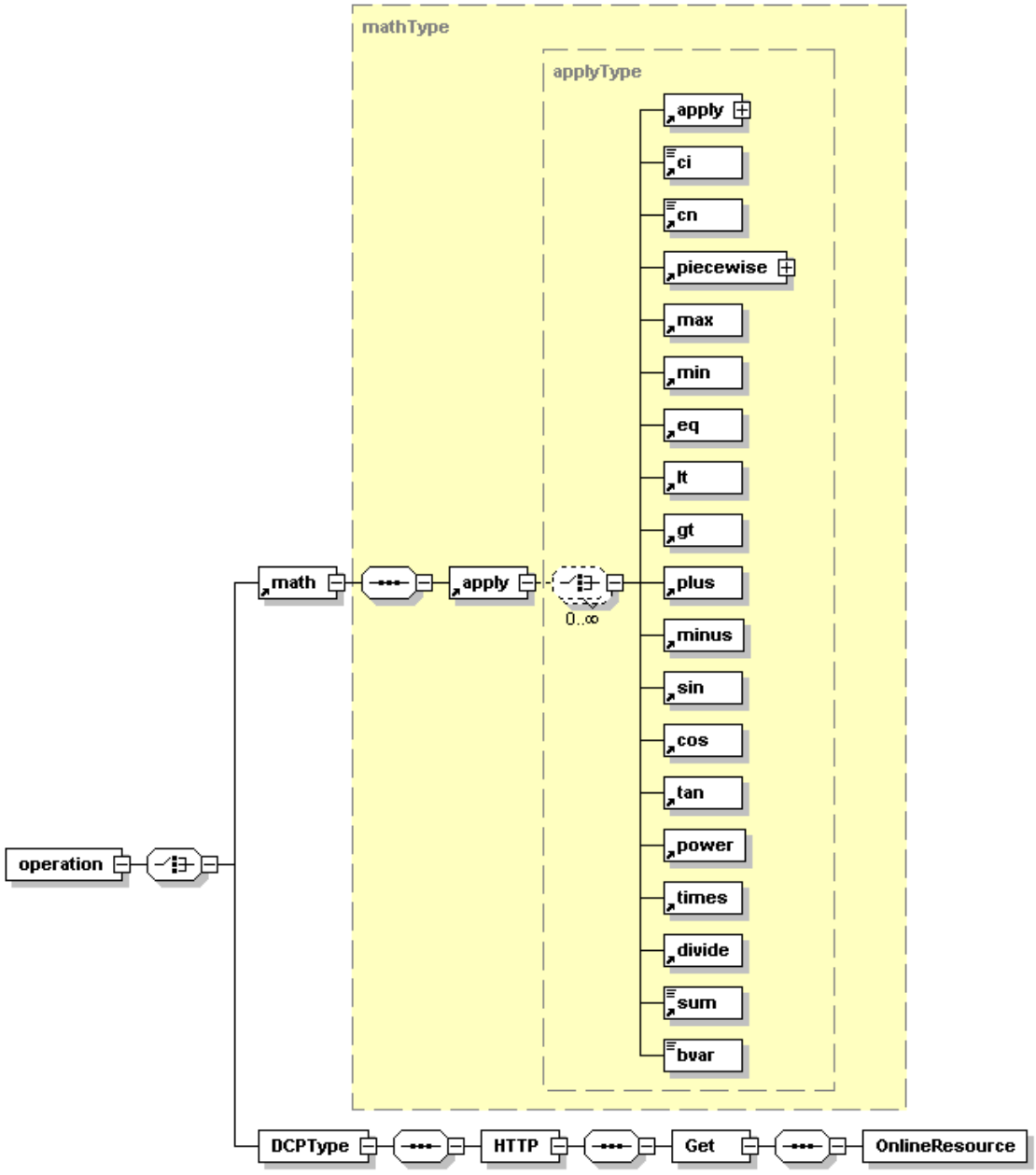


Figure 16 XCPF object operation

The mathematical formulae is encoded by using a subset of the Mathematical Mark-up Language (MathML) definition, recommended by the WWW-Consortium (W3C). This standard is suitable to encode mathematical formula in XML. It offers more than 50 mathematical operations. XCPF uses only basic operations, like plus, minus, min and other (See figure 16). The program 1 and 2 gives an example of the formula encoding with MathML.

Program 1 price = pricePerSquareKilometer * surface

```
<math>
      <apply>
            <eq/>
                  <ci>price</ci>
                        <apply>
                           <times/>
                              <ci>pricePerSquareKilometer</ci>
                              <ci>surface</ci>
                        </apply>
      </apply>
</math>
```

Program 2 Encoding of formulae with MathML

The other possible operation is a XCPF Web Service Call. The element "OnlineResource" contains an absolute URL to a web service for external processing.

3.2.1.6 XCPF Object "productGroup"

With the use of these elements, "product" objects can be arranged. It contains most sub elements like the "product". But it can contain an "inheritance" object and one or more "product" objects. "ProductGroup" can be containing one or more other "productGroup" objects.

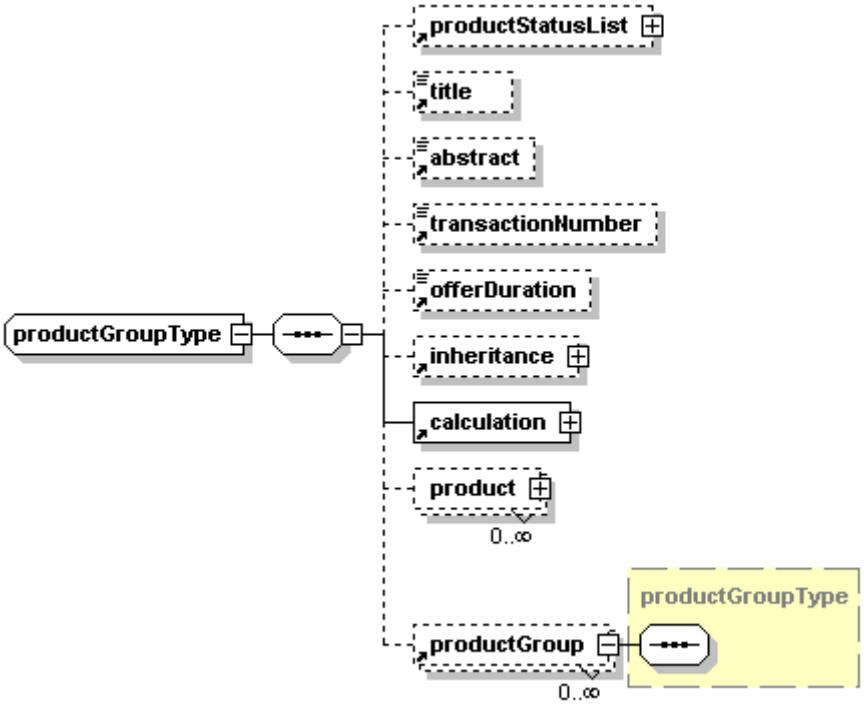


Figure 17 XCPF Object "productGroup"

3.2.1.7 XCPF Object "Inheritance"

The inheritance method provides a very powerful and useful optimisation mechanism for large data entries. It may contain most repeated XCPF elements for inheritance, e.g. contract information and calculation blocks. Inheritance can be overwritten in following "productGroups" or "products".

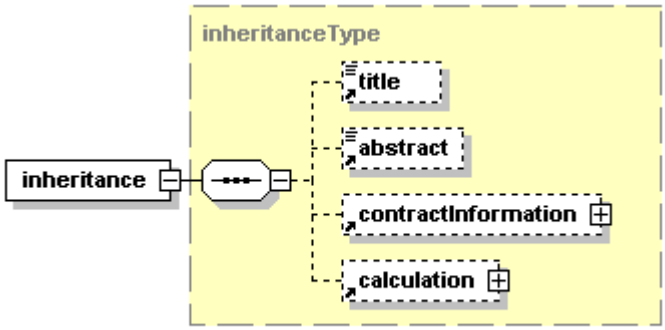


Figure 18 XCPF object "inheritance"

3.2.1.8 Main structure axes

The main axes in XCPF are “xcpfEnvelope”, “xcpfCatalog”, multiple “productGroup” objects and finally products.

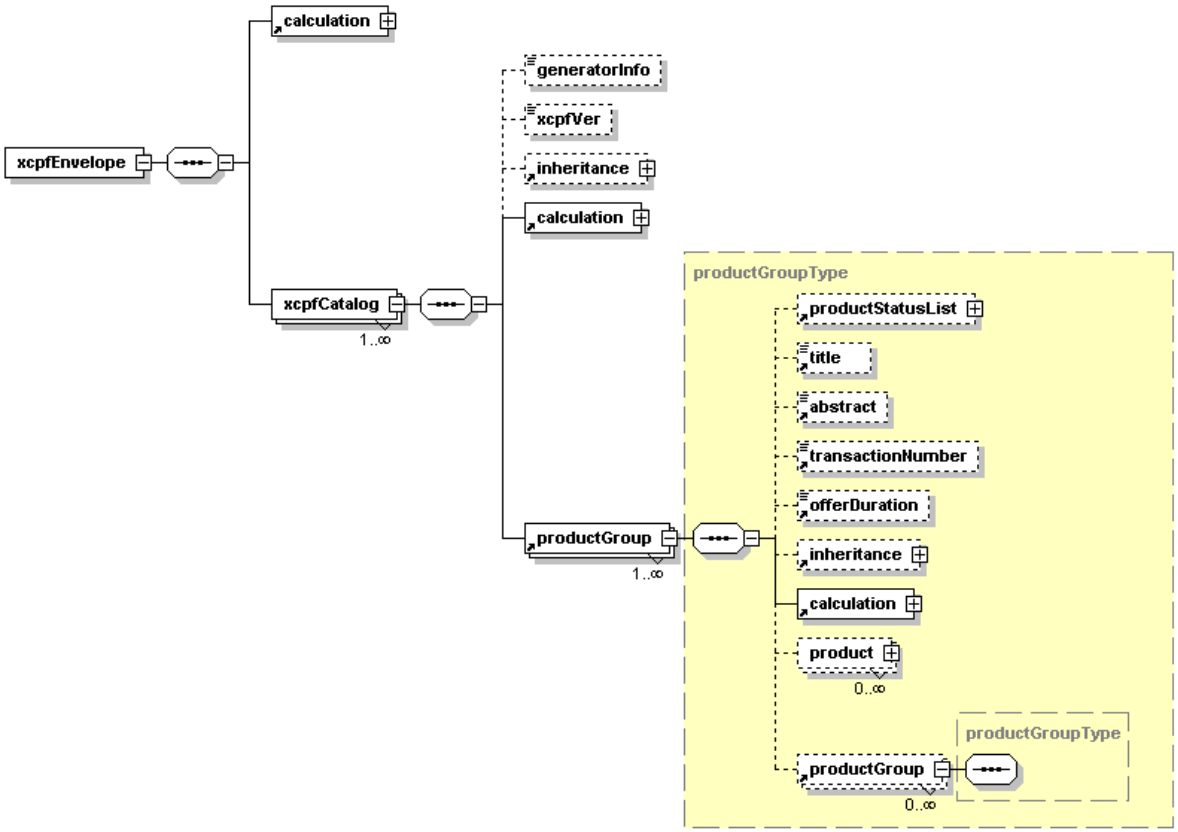


Figure 19 XCPF main axis

3.2.2 Applied Functionality: Web Pricing & Ordering Service (WPOS)

The WPOS has six methods to process a complete pricing, ordering and delivery workflow for digital geo-data products. These products are defined as service requests, which may be created in specialized clients, and additional configuration parameters. Some requests are designed to be repeated several times like the GetPrice request. The results may be stored in the WPOS client in a session. The famous "shopping cart" is a good example.
The workflow of a Geo-eBusiness application corresponds to the here listed request sequence.
Because of the same data model, the "Δ" (Delta) method principle, where each method adds a new differential part to the XCPF object and the complete XCPF object will be delivered in the response, the differential part can be encoded for HTTP GET request as key-value pairs or for HTTP POST request as XML objects.

3.2.2.1 Method: GetCapabilities

The OGC Basic Model request GetCapabilities delivers the WPOS client, beyond the standard information, a list of all available products, including a short description and an unique identifier, the product ID.

3.2.2.1.1 HTTP Get Request

The requests is designed along the OGC Basic Service Model.

URL Component	Required/ optional/ experimental	Description
http://server_address/path/script	R	URL prefix of service online resource.
?	R	Separator between prefix and query.
SERVICE=WPOS	R	Service Type
REQUEST=GetCapabilities	R	Request Capabilities
VERSION=version	O	Request version
VSP =value	O	Vendor-specific parameters
&	R	Separator between name=value pairs.

Table 5 Standard GetCapabilities Request

3.2.2.1.1.1 Request Example

This requests demands the capabilities of the service WPOS:

```
http://127.0.0.1/wpos/servlet/wpos.Controller?SERVICE=WPOS&REQUEST=getCapa
bilities
```

Program 3 HTTP GET request for service capabilities

3.2.2.1.2 Response

The response consists of the standard BSM "Service" element items and the WPOS specific "capability" elements. The "request" element shows the supported requests. The request "GetProduct" and "GetOrderList" are optional. Figure 20 shows the XML schema.

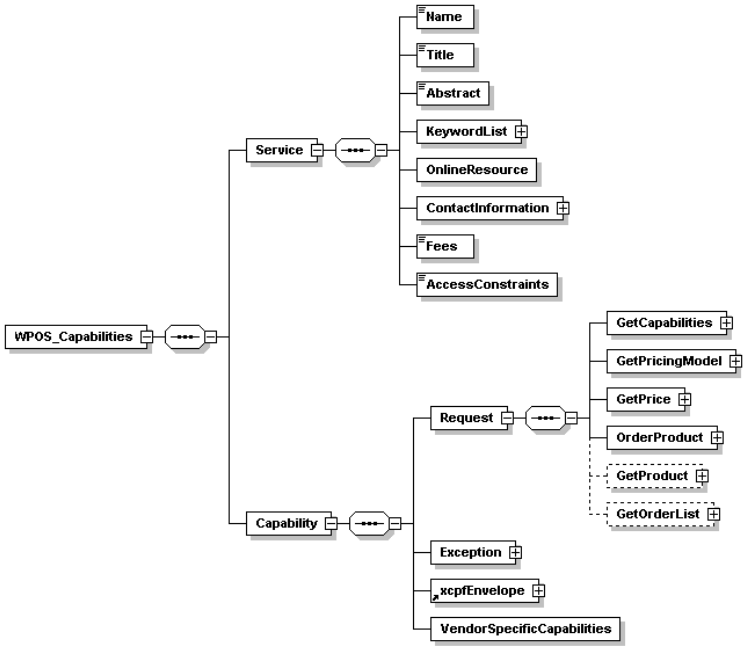


Figure 20 Getcapabilities Response

The element "xcpfEnvelope" contains the product list. Because of the hierarchical systematics of the XML complex Configuration & Pricing Format (XCPF) the product items can be grouped by catalogues and multiple product groups. Catalogues are required in the cascading case with independent data provider.

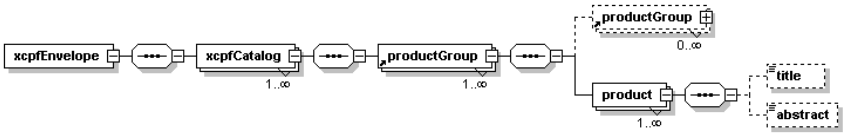


Figure 21 Sub-Element "xcpfEnvelope" of the Getcapabilities response schema.

The "product" element contains the unique identifier for all other methods, a title and an abstract element to describe the product is a short way. ISO 19115 may be used for the complete description and referenced by the mentioned product ID. Figure 21 shows the list of products and the grouping mechanism. This presentation does not show the product ID, because it is an attribute.

3.2.2.1.2.1 Response Example Fragment

The XML fragment at program 3 gives an impression of the arrangement of product items. “productGroup” and “product” elements have an identifier and a name to show as an abbreviation. A title and an abstract can contain longer descriptions.

```
<xcpfEnvelope>
   <xcpfCatalog>
      <productGroup id="1000" name="Demo Productlist 1000">
         <product id="1005" name="Demo Product A1">
           <title> Demo Title of Product A1 </title>
         </product>
         <product id="1007" name="Demo Product B1"/>
         <product id="1009" name="Demo Product C1"/>
      </productGroup>
      <productGroup id="2000" name="Demo Productlist 2000">
         <product id="2001" name="Demo Product A2"/>
         <product id="2002" name="Demo Product B2"/>
      </productGroup>
   </xcpfCatalog>
</xcpfEnvelope>
```

Program 4 The list of products in a XML extract of the GetCapabilities response.

3.2.2.2 Method: GetPriceModel

The first method GetCapabilities gives a list of all product entries, which may be quite long. Products are often described in detail with the ISO 19115 standard and hosted in a meta-data catalog, which offers enhanced query capabilities. If the IDs in the meta-data catalogue correspond to the IDs in the pricing & ordering catalog, a user can be linked directly from the search result-list of the meta-data catalogue to WPOS GetPriceModel request for pricing information.

3.2.2.2.1 HTTP GET Request

The request requires the knowledge of the identifier of a product ("productID"). It is possible to request multiple product pricing information with a comma separated list.

URL Component	Required/ optional/ experimental	Description
http://server_address/path/script	R	URL prefix of service online resource.
?	R	Separator between prefix and query.
REQUEST=GetPriceModel	R	Request Price Model
VERSION=version	R	Request Version
PRODUCTID=productid_list	R	Request Product Ids, separated by commas
VSP =value	O	Vendor-specific parameters
&	R	Separator between name=value pairs.

Table 6 GetPriceModel Request

3.2.2.2.1.1 Example

```
http://127.0.0.1/wpos/servlet/wpos.Controller?REQUEST=GetPriceModel&PRODUC
TID=1513
```

Program 5 Sample GetPriceModel HTTP Get request

3.2.2.2.2 Response

The response is an empty instance of a XCPF Object. It contains the desired "product" elements with contract information like provider address and licensing (See figure 22).

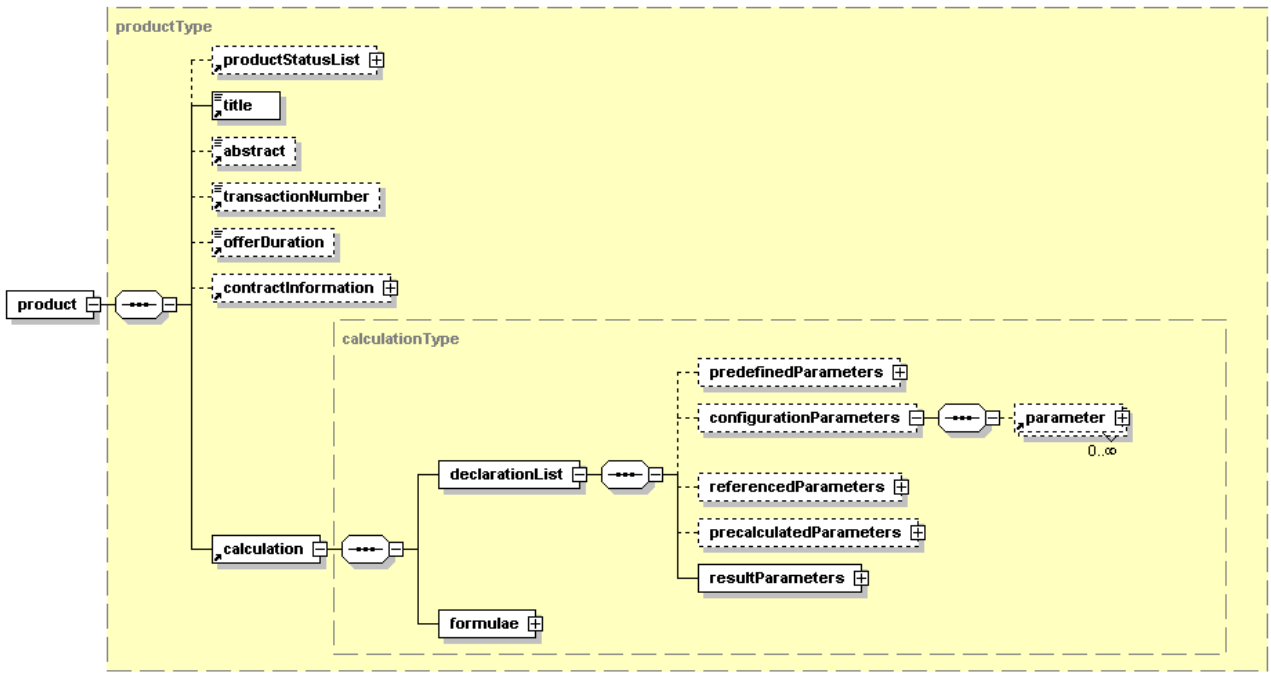


Figure 22 The important "product" element of a XCPF object in the GetPriceModel response

Therefore, the XCPF object provides all necessary information and even the price formula for pricing & ordering. It could be used for multiple purposes. In the case of a regular WPOS workflow it contains the important list of configuration parameters. These parameter need to be set by the user (or an equivalent engine) to configure the product for pricing & ordering. Figure 23 shows the sub-elements of parameter. Multiple "variableValue" elements can be presented as HTML lists. Missing or single "variableValue" elements can be presented as HTML text input fields. Boolean types of parameter as HTML checkboxes. All elements are covered in detail in the XCPF description.

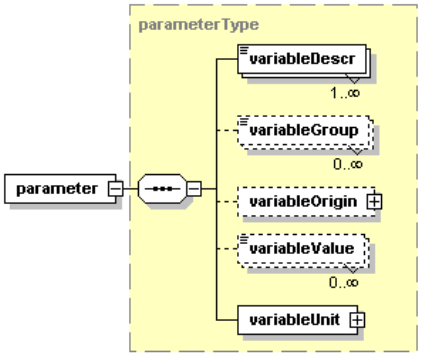


Figure 23 The configuration "parameter" element, which needs to be set by purchaser to configure the product

3.2.2.2.2.1 Example Fragment

The given example shows a simple parameter element with the mandatory name, the simple data type and the engine read-able and text-style unit. The empty "variableValue" element shows, that it has to be set by the user.

```
<parameter name="ymin" type="real">
   <variableDescr lang="en">Southern Bounding</variableDescr>
      <variableValue/>
      <variableUnit textstyle="°">
         <math>
            <apply>
               <cn>1</cn>
            </apply>
         </math>
      </variableUnit>
</parameter>
```

Program 6 Sub-element „Parameter" with name and description

3.2.2.3 Method: GetPrice

After setting the configuration parameters with user defined values, the GetPrice method is able to calculate a price.

3.2.2.3.1 HTTP GET Request

WPOS is designed to support the pricing & ordering of known geo-data services, e.g. OGC WMS and of unknown data services or in a simple case of data files. Price model may contain parameter, which are required

- only for pricing, e.g. licensing time, or
- only for geo-data server configuration, e.g. picture pixels,
- or for both, e.g. dpi, if the price depends on the quality

Therefore the configuration parameters can be encoded as "configparams", as a "SERVICEREQUEST", which contains the original geo-data server requests, or both. The parameter values need to be "escaped".
For multiple pricing request, the HTTP parameter "PRODUCTID", "CONFIGPARAMS", "SERVICEREQUEST" and "SERVICEPROTOCOL" can include comma separated lists. Three examples will help to understand these possibilities. The underlined sections are "escaped" strings.
All WPOS configuration parameters will be mapped to the XCPF configuration parameters.

URL Component	Required/ optional/ experimental	Description
http://server_address/path/script	R	URL prefix of service online resource.
?	R	Separator between prefix and query.
VERSION=version	R	Request version
REQUEST=GetPrice	R	Request Price
PRODUCTID=productid_list	R	Product IDs, "escaped" Service prefix URLs are unique and can be therefore used as a Product ID
CONFIGPARAMS= escaped(keyA&valueA, keyAA&valueAA),	R	Each Product ID may have some configuration parameters. These are "key-value pair" encoded, separated by commas and as string "escaped";
SERVICEREQUEST= escaped(servicerequestA),	R	Original "escaped" data service request; Multiple service requests are comma separated
SERVICEPROTOCOL= escaped(ORGANISATION=abc& NAME=def&VERSION=x.x.x),	R	Description of protocol- releasing organization, -name and –version as escaped key-value pairs;
GENERALLICENCENO	O	Permit Customer Specific Pricing
VSP=value	O	Vendor-specific parameters
&	R	Separator between name=value pairs.

Table 7 GetPrice Request

3.2.2.3.1.1 Example HTTP GET Request for unknown Services

In this simple case, the product 1513 requires the configuration parameters xmin=5.67, ymin=50.3,xmax=5.913, ymax=52 and the Licensetime=1 for the price formula. The

second product 1012 requires the other parameters and their values.
The key value pairs are being separated with an "&" and escaped. Because of multiple sets of configuration parameters, the two strings are being separated by a comma.

```
http://127.0.0.1/wpos/servlet/wpos.Controller?
REQUEST=GetPrice&PRODUCTID=1513,1012&CONFIGPARAMS=xmin%3D5.67%26ymin%3D50.
3%26xmax%3D5.913%26ymax%3D52%26Licensetime%3D1,Pages%3D4%26Area%3D1000%26P
oints%3D3&SERVICEREQUEST=,&SERVICEPROTOCOL=,
```

Program 7 Sample HTTP Get Request for GetPrice for multiple products of an unknown Service

3.2.2.3.1.2 Example HTTP GET Request for known Services without additional Parameters

This example shows a known Web Mapping Service request wrapped for a pricing request. The price can be terminated only with the geo-data request. Therefore is a mapping between geo service request and XCPF configparams necessary. The service protocol parameter is designed to support this mapping.

```
http://127.0.0.1/wpos/servlet/wpos.Controller?
REQUEST=GetPrice&PRODUCTID=http%3A%2F%2Fwww.mywms.org/script&CONFIGPARAMS=
&SERVICEREQUEST=VERSION%3D1.1.0%26REQUEST%3DGetMap%26LAYERS%3DStrassen%26S
TYLES%3DStandard%26SRS%3DEPSG:31466%26FORMAT%3Dimage/png%26BGCOLOR%3D0xFFF
FFF%26TRANSPARENT%3DFALSE%26WIDTH%3D514%26HEIGHT%3D426%26BBOX%3D2465148.76
44131454,5576452,2764016.1155868545,5824151.4%26EXCEPTIONS%3Dapplication/v
nd.ogc.se_xml&SERVICEPROTOCOL=ORGANISATION%3DOGC%26NAME%3DWMS%26VERSION%3D
1.1.0
```

Program 8 Sample HTTP Get Request for GetPrice with a service request and without additional parameters

3.2.2.3.1.3 Example HTTP GET Request for known Services with additional Parameters

Pricing often depends on more than just the technical geo service request. In this case the configuration parameters are given with the configparams and the geo-data request.

```
http://127.0.0.1/wpos/servlet/wpos.Controller?
REQUEST=GetPrice&PRODUCTID=http%3A%2F%2Fwww.mywms.org/script&CONFIGPARAMS=
Licensetime%3D1&SERVICEREQUEST=VERSION%3D1.1.0%26REQUEST%3DGetMap%26LAYERS
%3DStrassen%26STYLES%3DStandard%26SRS%3DEPSG:31466%26FORMAT%3Dimage/png%26
BGCOLOR%3D0xFFFFFF%26TRANSPARENT%3DFALSE%26WIDTH%3D514%26HEIGHT%3D426%26BB
OX%3D2465148.7644131454,5576452,2764016.1155868545,5824151.4%26EXCEPTIONS%
3Dapplication/vnd.ogc.se_xml&SERVICEPROTOCOL=ORGANISATION%3DOGC%26NAME%3DW
MS%26VERSION%3D1.1.0
```

Program 9 Sample HTTP Get Request for GetPrice with a service request and without additional parameters

3.2.2.3.2 Response

The response is a XCPF object with the given configuration parameters and the price results. The XCPF object contains the basic "product" element price, all group prices with summation or other calculations, e.g. minimum prices or tax and the final result price over all selected products.

3.2.2.3.2.1 Example Response

The GetPrice Request transmits all necessary configuration parameters for the mathematical formulae. Figure 24 shows and XCPF example. The WPOS implementations calculates first the basic price on product level (step 1 & 2) for all selected products. The following steps calculate the intermediate prices (step 3 & 4) on product group level and finally on catalogue level (step 5).

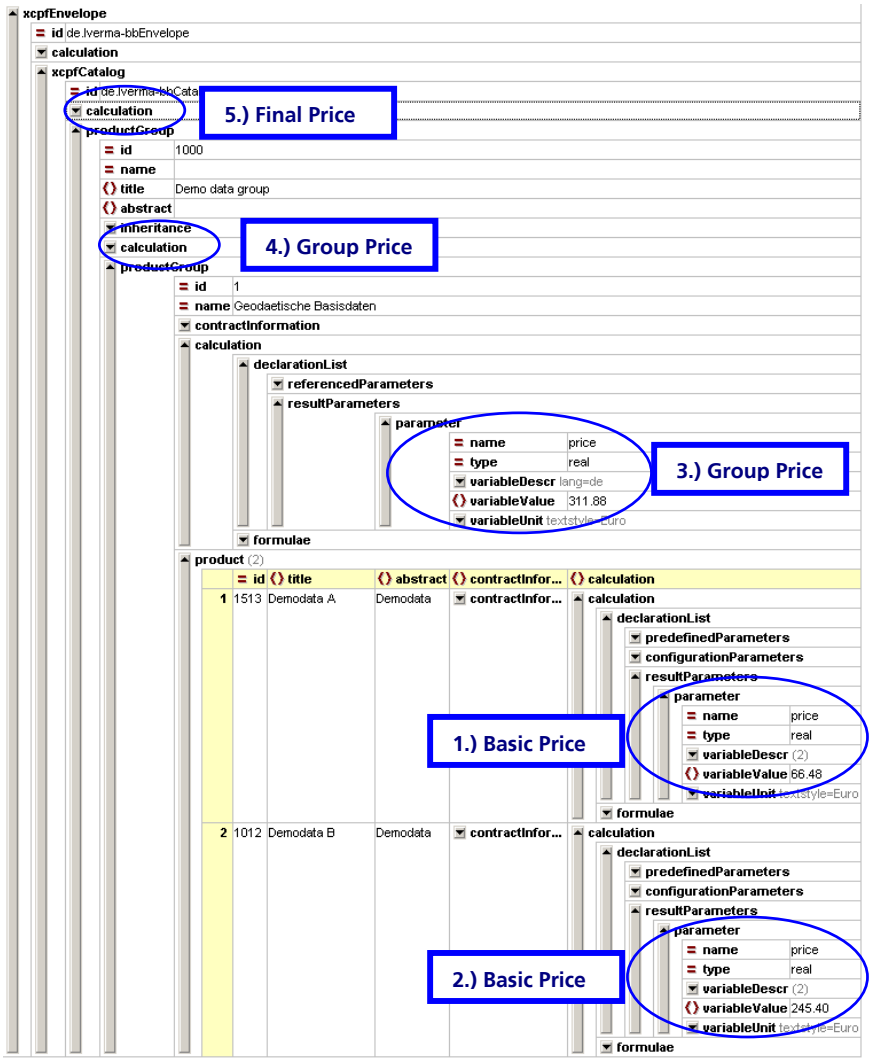


Figure 24 XCPF object filled with the calculated basic, intermediate and final prices.

3.2.2.4 Method: OrderProduct

We GetPrice method may be used for some iterations. The next step in the WPOS workflow is ordering, which is a juristic act. The purchaser needs to publish his identity.

3.2.2.4.1 HTTP GET Request

To ensure the purchaser configuration and the resulting price, the OrderProduct method consists of the same parameter as GetPrice and additional purchaser contact information.

URL Component	Required/ optional/ experimental	Description
http://server_address/path/script	R	URL prefix of service online resource.
?	R	Separator between prefix and query.
VERSION=version	R	Request version
REQUEST=OrderProduct	R	Orders a product
PRODUCTID=productid_list	R	Product IDs, "escaped" Service prefix URLs are unique and can be therefore used as a Product ID
CONFIGPARAMS= escaped(keyA&valueA, keyAA&valueAA),	R	Each Product ID may have some configuration parameters. These are "key-value pair" encoded, separated by commas and as string "escaped";
SERVICEREQUEST= escaped(servicerequestA),	R	Original "escaped" data service request; Multiple service requests are comma separated
SERVICEPROTOCOL= escaped(ORGANISATION=abc& NAME=def&VERSION=x.x.x),	R	Description of protocol- releasing organization, -name and –version as escaped key-value pairs;
GENERALLICENCENO	O	Permit Customer Specific Pricing
GENERALLICENCENO	E	Permit Customer Specific Pricing
CUSTOMERID	O	Customerid
DEFNAME1	R	Default contact information for accounting and billing.
DEFNAME2	O	
DEFSTREET	R	
DEFZIP	R	
DEFCITY	R	
DEFCOUNTRY	O	
DEFPHONE	O	
DEFFAX	O	
DEFEMAIL	R	
DEFURL	O	
DELNAME1	O	Delivery contact information, if different from default contact information
DELNAME2	O	
DELSTREET	O	
DELZIP	O	
DELCITY	O	
DELCOUNTRY	O	
DELPHONE	O	
DELFAX	O	
DELEMAIL	O	
DELURL	O	
BILNAME1	O	Billing contact information, if different from default contact information
BILNAME2	O	
BILSTREET	O	
BILZIP	O	
BILCITY	O	
BILCOUNTRY	O	
BILPHONE	O	

BILFAX	O
BILEMAIL	O
BILURL	O

Table 8 HTTP GET OrderProduct request

3.2.2.4.1.1 Example

This example was derived from the third GetPrice example. The contact information are attached.

```
http://127.0.0.1/wpos/servlet/wpos.Controller?
REQUEST=OrderProduct&PRODUCTID=http%3A%2F%2Fwww.mywms.org/script&CONFIGPAR
AMS=Licensetime%3D1&serviceRequest=VERSION%3D1.1.0%26REQUEST%3DGetMap%26LA
YERS%3DStrassen%26STYLES%3DStandard%26SRS%3DEPSG:31466%26FORMAT%3Dimage/pn
g%26BGCOLOR%3D0xFFFFFF%26TRANSPARENT%3DFALSE%26WIDTH%3D514%26HEIGHT%3D426%
26BBOX%3D2465148.7644131454,5576452,2764016.1155868545,5824151.4%26EXCEPTI
ONS%3Dapplication/vnd.ogc.se_xml&SERVICEPROTOCOL=ORGANISATION%3DOGC%26NAME
%3DWMS%26VERSION%3D1.1.0&DEFNAME1=Wagner&DEFSTREET=Emil-Figge-
Str.91&DEFZIP=44227&DEFCITY=Dortmund&DEFMAIL=w@gner.org
```

Program 10 OrderProduct HTTP GET example

3.2.2.4.2 Response

The response is the XCPF object as from GetPrice, but with added

- transaction number ID (TAN)
- purchaser contact information
- customer ID
- status information

The transaction number is necessary to retrieve the desired often binary geo-data in the next WPOS workflow step. The used location to store the transaction depends on the kind of delivery. If multiple product data will be integrated or compressed to a single delivery file, only a single transaction number is necessary for the package. This can be stored on catalogue level. If each sub product should be downloadable, each product item needs a transaction number.
The customerID is being generated by the system or taken from former orders. With that abbreviation, the WPOS method GetOrderList can be invoked.

3.2.2.5 Method: GetProduct

Some product are in a binary shape. Therefore an additional delivery method is necessary and reasonable. The OrderProduct responses returns in the XCPF object one or more transaction-numbers (TANs). With that TAN, the download of the online product can be invoked.

3.2.2.5.1 HTTP GET Request

URL Component	Required/ optional/ experimental	Description
http://server_address/path/script	R	URL prefix of service online resource.
?	R	Separator between prefix and query.
VERSION=version	R	Request version
REQUEST=GetProduct	R	Request Product
TAN=tan	R	Request Transaction number
VSP =value	O	Vendor-specific parameters
&	R	Separator between name=value pairs.

Table 9 HTTP Get Request

3.2.2.5.1.1 Request example

```
http://127.0.0.1/wpos/servlet/wpos.Controller?/wpos/servlet/
wpos.Controller?REQUEST=GetProduct&TAN=1616121821270866532
```

Program 11 HTTP GET GetProduct Example

3.2.2.5.2 Response

The response contains the desired product file. In the case of a compressed file, the mime type has to be set.

3.2.2.6 Method: GetOrderList

This optional requests delivery a valid XCPF object with all actual processed order items. It can be used to gather status information, e.g. if a product is generated and ready for download.

3.2.2.6.1 Request

URL Component	Required/ optional/ experimental	Description
http://server_address/path/script	R	URL prefix of service online resource.
?	R	Separator between prefix and query.
REQUEST=GetOrderList	R	Request Product
CUSTOMERID=	R	The customer ID, which was given in OrderProduct

3.2.2.6.1.1 Example

```
http://127.0.0.1/wpos/servlet/wpos.Controller?REQUEST=GetOrderList&CUSTOME
RID=14175479211139083 82
```

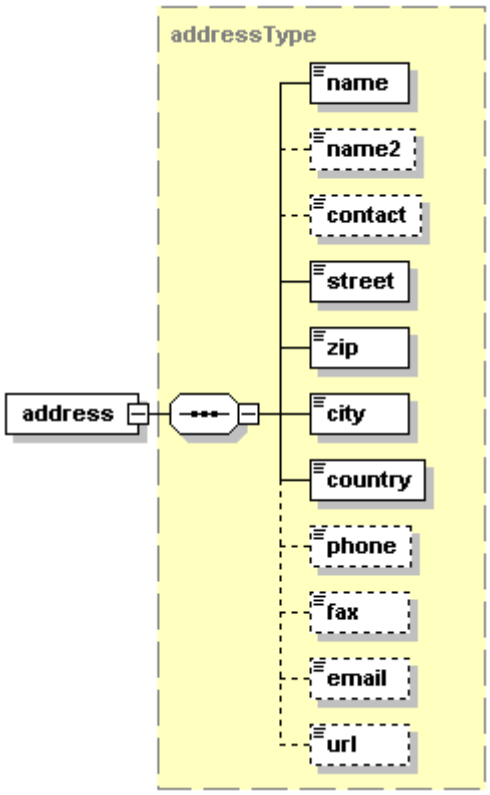
Program 12 HTTP GET request example of GetOrderList

3.3 General XCPF 1.0.0-v6 elements

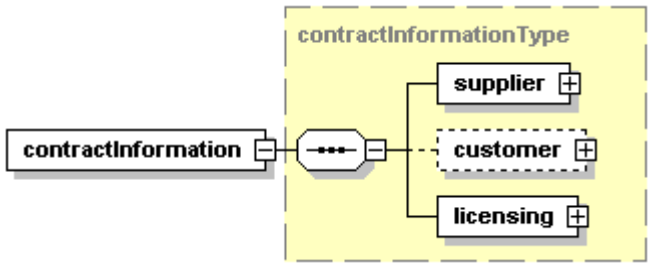
3.3.1 element abstract

Diagram		
Type	**xs:string**	
used by	complexTypes	inheritanceType productGroupType productType
Annotation	documentation	Abstracts may be used to give some more background information about the productGroup or the product. Complete product description may be made in an ISO19115 description and referenced by a productId.

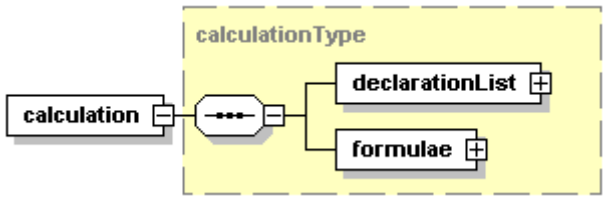
3.3.2 element address

Diagram		
Type	addressType	
Children	name name2 contact street zip city country phone fax email url	
used by	elements	contractInformationType/customer contractInformationType/supplier
Attributes	Name: role Type: xs:NMTOKEN Use: required Default: Fixed: Name: type Type: xs:NMTOKEN	
Annotation	documentation	Contact information, In the case of a customer use, there might be more entries.

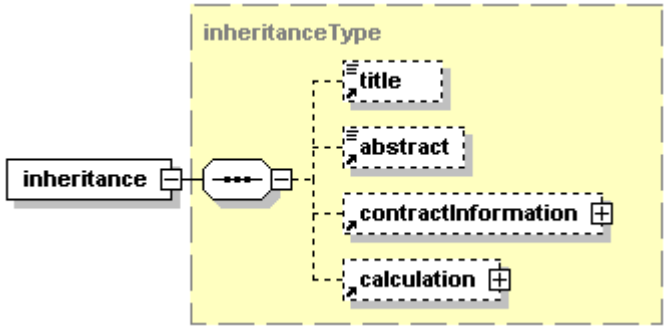
3.3.3 element contractInformation

diagram		
type	contractInformationType	
children	supplier customer licensing	
used by	complexTypes	inheritanceType productType
annotation	documentation	Orders can be processed under curtain circumstances, which must be declared in a contract.

3.3.4 element calculation

diagram		
type	calculationType	
children	declarationList formulae	
used by	elements complexTypes	xcpfEnvelope/xcpfCatalog xcpfEnvelope inheritanceType productGroupType productType
annotation	documentation	Because of rebates, taxes or other pricing mechanisms, pricing models may be adjusted with a formula on each hierarchical step of the pricing catalog; At least, a simple sum formula must be calculated

3.3.5 element inheritance

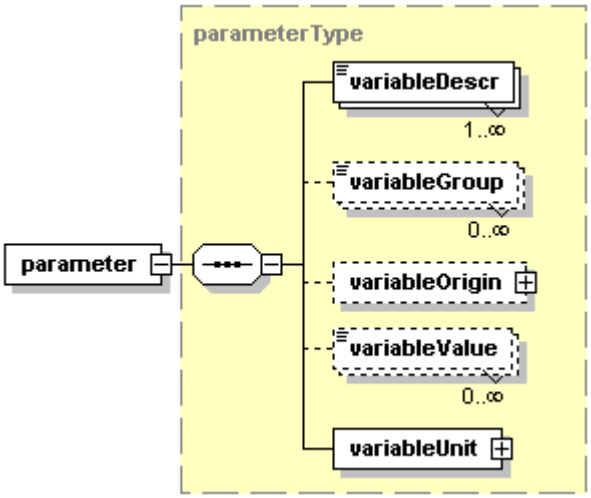
diagram		

type	**inheritanceType**	
children	**title abstract contractInformation calculation**	
used by	element complexType	**xcpfEnvelope/xcpfCatalog** **productGroupType**
annotation	documentation	The inheritance method provides a very powerful and useful optimisation for large data entries. It may contain most repeated XCPF elements for inheritance, e.g. contract information and calculation blocks. Inheritance can be overwritten in following productGroups or products

3.3.6 element offerDuration

diagram		
type	**xs:string**	
used by	complexTypes	**productGroupType productType**
annotation	documentation	Valid timeframe for that offer.

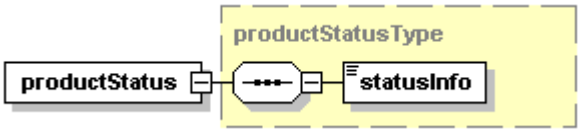
3.3.7 element parameter

diagram					
type	**parameterType**				
children	**variableDescr variableGroup variableOrigin variableValue variableUnit**				
used by	elements	**calculationType/declarationList/configurationParameters** **calculationType/declarationList/precalculatedParameters** **calculationType/declarationList/predefinedParameters** **calculationType/declarationList/referencedParameters** **calculationType/declarationList/resultParameters**			
attributes	Name	Type	Use	Default	Fixed
	name	xs:string	required		
	type	xs:NMTOKEN	required		
annotation	documentation	The parameter object is the basic element for the calculation			

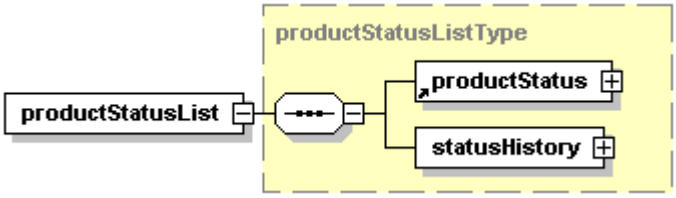
3.3.8 element parameterName

diagram		
type	**xs:string**	
used by	elements	**calculationType/formulae/function/inParameterList** **calculationType/formulae/function/outParameterList**
annotation	documentation	All used parameter need to be declared in the declaration List block. Therefore they do not be completley redeclared by calling a function, but only be named.

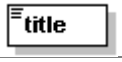
3.3.9 element productStatus

diagram					
type	**productStatusType**				
children	**statusInfo**				
used by	element complexType	**productStatusListType/statusHistory** **productStatusListType**			
attributes	Name date time statusCode	Type xs:string xs:string xs:NMTOKEN	Use required required required	Default	Fixed
annotation	documentation	Current status with time, date and statuscode attributes. The status changes when a WPOS operation is processed			

3.3.10 element productStatusList

diagram		
type	**productStatusListType**	
children	**productStatus** **statusHistory**	
used by	element complexTypes	**xcpfEnvelope/xcpfCatalog** **productGroupType** **productType**
annotation	documentation	The Web Pricing & Ordering Service uses an instance of the XCPF pricing model to store order process information into this status list.

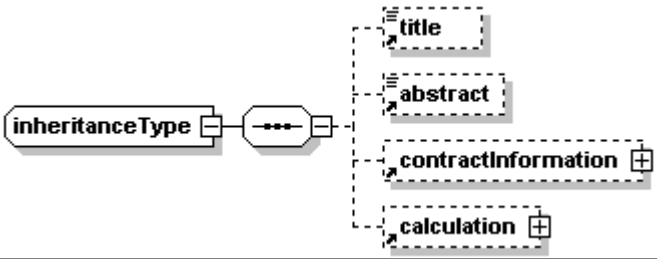
3.3.11 element title

diagram		
type	**xs:string**	
used by	complexTypes	inheritanceType productGroupType productType
annotation	documentation	Each productGroup may have a title, but each product must have a title.

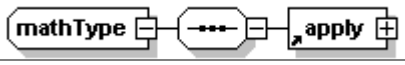
3.3.12 element transactionNumber

diagram		
type	**xs:string**	
used by	element complexTypes	xcpfEnvelope/xcpfCatalog productGroupType productType
annotation	documentation	This number acts as an ID within processing steps. A transactionNumber may target to a productGroup, if a processing groups all "product" data files into one, e.g. zip compression, or in a "product", if each packet will be delivered separately. The WPOS "orderProduct" sets a transactionNumber in a XCPF instance and sends it to the client, who will request a data product file with the WPOS request "getProduct" and this transaction number.

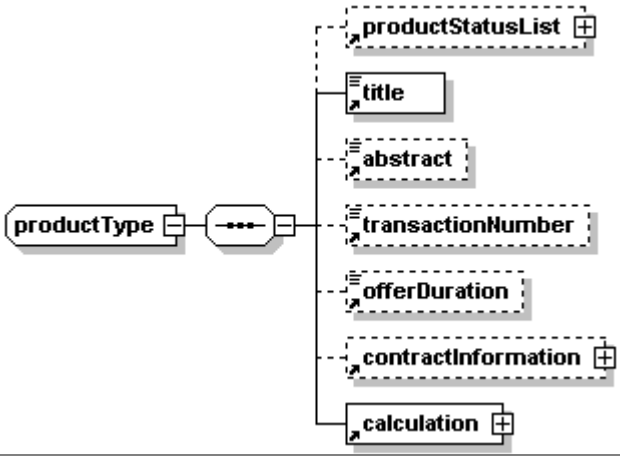
3.3.13 complexType inheritanceType

diagram		
children	title abstract contractInformation calculation	
used by	element	inheritance

3.3.14 complexType mathType

diagram		
children	apply	
used by	element	math

3.3.15 complexType productType

diagram	
children	productStatusList title abstract transactionNumber offerDuration contractInformation calculation
used by	element productGroupType/product

attributes	Name	Type	Use	Default	Fixed
	id	xs:string	required		
	name	xs:string			

3.3.16 simpleType xlink:actuateEnum

namespace	http://www.w3.org/1999/xlink
type	restriction of **xs:string**

facets		
	enumeration	onLoad
	enumeration	onRequest
	enumeration	other
	enumeration	none

3.3.17 simpleType xlink:showEnum

namespace	http://www.w3.org/1999/xlink
type	restriction of **xs:string**

facets		
	enumeration	new
	enumeration	replace
	enumeration	embed
	enumeration	other
	enumeration	none

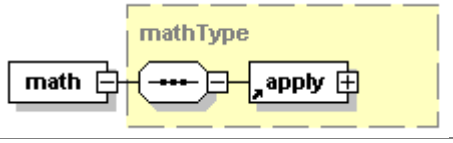
3.3.18 simpleType xlink:typeEnum

namespace	http://www.w3.org/1999/xlink

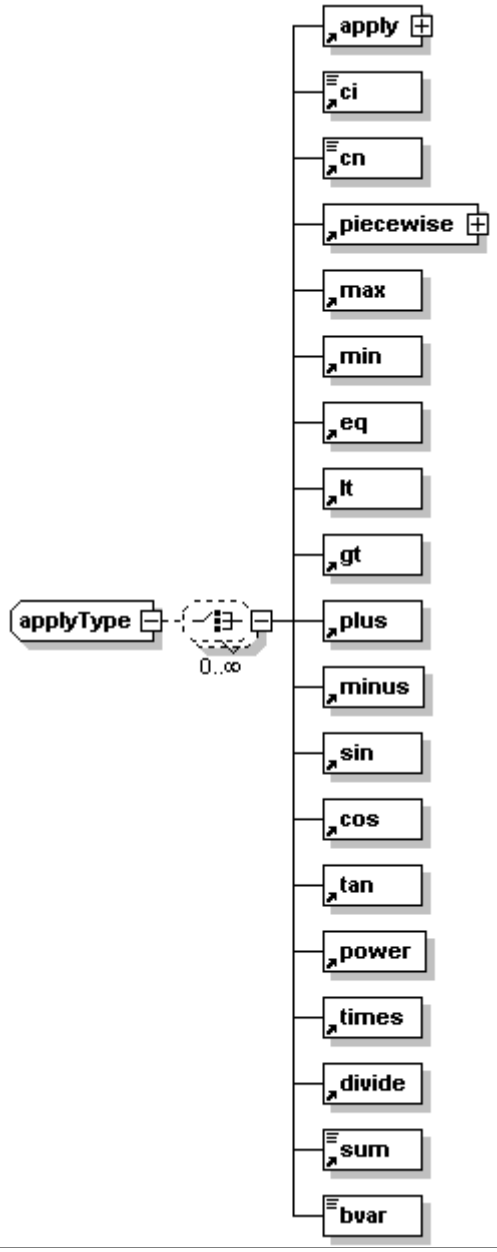
type	restriction of **xs:string**	
facets	enumeration	simple
	enumeration	extended
	enumeration	locator
	enumeration	arc
	enumeration	resource
	enumeration	title

3.4 MathML elements

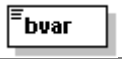
3.4.1 element math

diagram	
type	**mathType**
children	**apply**
used by	elements **calculationType/formulae/function/operation parameterType/variableUnit**
annotation	documentation MathML block, within this block a subset of MathML is being used. More at http://www.w3c.org/math

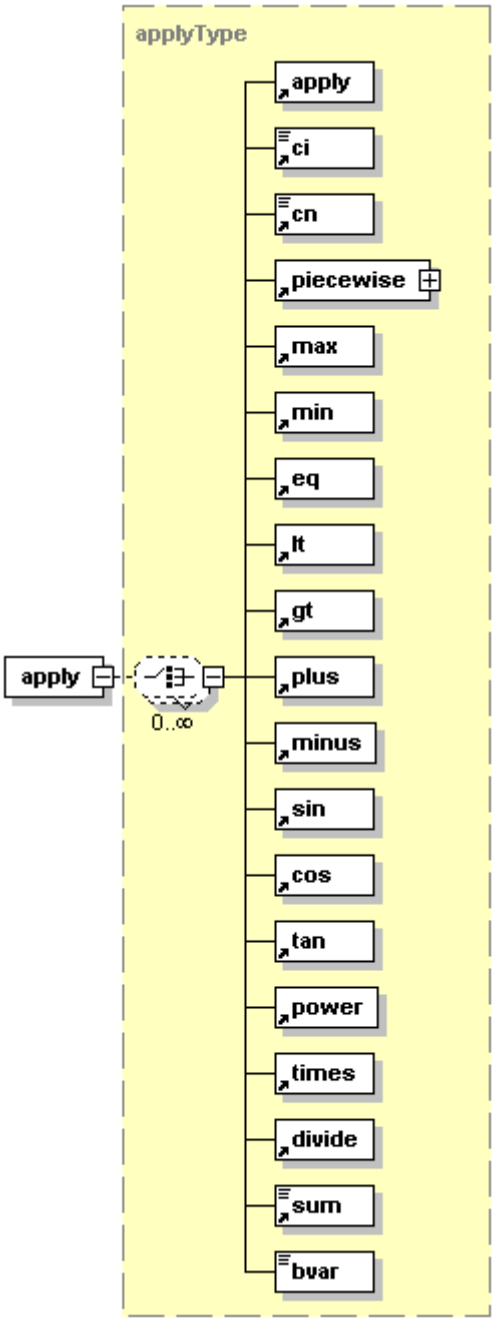
3.4.2 complexType applyType

diagram	
children	apply ci cn piecewise max min eq lt gt plus minus sin cos tan power times divide sum bvar
used by	elements apply piecewise/otherwise/apply

3.4.3 element applyType/bvar

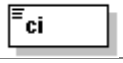
diagram	
type	**xs:string**
annotation	documentation MathML: bounding variable, used by "sum" operation

3.4.4 element apply

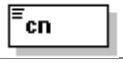
Diagram	
type	applyType

children	apply ci cn piecewise max min eq lt gt plus minus sin cos tan power times divide sum bvar	
used by	element	piecewise/piece
	complexTypes	applyType mathType
annotation	documentation	MathML: Acts like a mathematical bracket

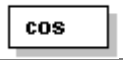
3.4.5 element ci

diagram		
type	xs:string	
used by	elements	piecewise/otherwise piecewise/otherwise piecewise/piece piecewise/piece
	complexType	applyType
annotation	documentation	MathML: Textfield for identifier, e.g. "price"

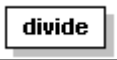
3.4.6 element cn

diagram		
type	xs:string	
used by	Elements	piecewise/otherwise piecewise/otherwise piecewise/piece piecewise/piece
	complexType	applyType
annotation	documentation	MathML: Textfield for a number, e.g. 2.2345

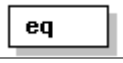
3.4.7 element cos

diagram		
used by	complexType	applyType
annotation	documentation	MathML: Cosinus operator

3.4.8 element divide

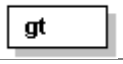
diagram		
used by	complexType	applyType
annotation	documentation	MathML: Division operator

3.4.9 element eq

diagram		
used by	complexType	applyType

annotation	documentation	MathML: Equal operator

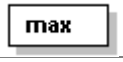
3.4.10 element gt

diagram		
used by	element complexType	piecewise/piece applyType
annotation	documentation	MathML: "bigger than" operator

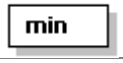
3.4.11 element lt

diagram		
used by	element complexType	piecewise/piece applyType
annotation	documentation	MathML: "Smaller then" operator

3.4.12 element max

diagram		
used by	complexType	applyType
annotation	documentation	MathML: Maximum operator

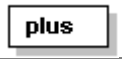
3.4.13 element min

diagram		
used by	complexType	applyType
annotation	documentation	MathML: Minimun operator

3.4.14 element minus

diagram		
used by	complexType	applyType
annotation	documentation	MathML: Minus operator

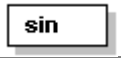
3.4.15 element plus

diagram	
used by	element piecewise/piece complexType applyType
annotation	documentation MathML: Plus operator

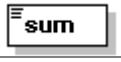
3.4.16 element power

diagram	
used by	complexType applyType
annotation	documentation MathML: Power operator

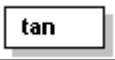
3.4.17 element sin

diagram	
used by	complexType applyType
annotation	documentation MathML: Sinus operator

3.4.18 element sum

diagram	
type	**xs:string**
used by	complexType applyType
annotation	documentation MathML: Sumeration operator

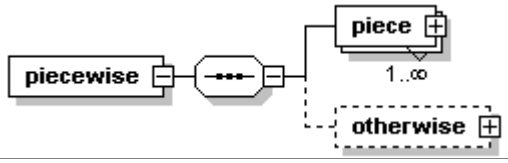
3.4.19 element tan

diagram	
used by	complexType applyType
annotation	documentation MathML: Tangence operator

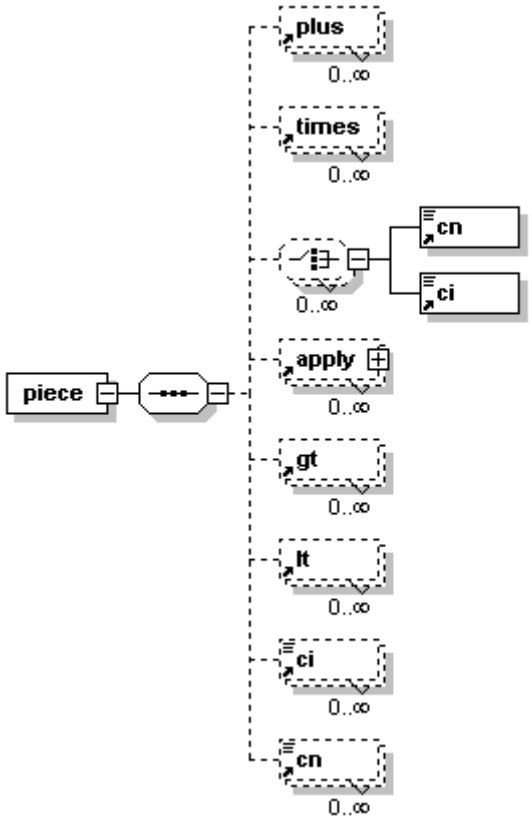
3.4.20 element times

diagram		
used by	elements	piecewise/otherwise piecewise/piece
	complexType	applyType
annotation	documentation	MathML: Times operator

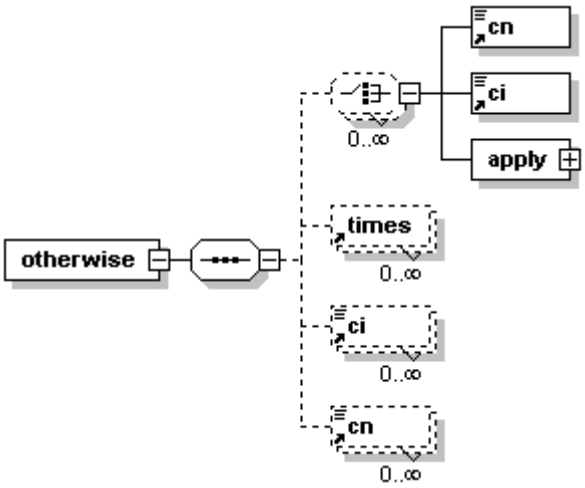
3.4.21 element piecewise

Diagram		
children	piece otherwise	
used by	complexType	applyType
annotation	documentation	MathML: mathematical "if..then" operator, example: <piecewise> <piece> <apply> <times/> <cn>15.34</cn> <ci>Punktanzahl</ci> </apply> <apply> <lt/> <ci>Punktanzahl</ci> <cn>2</cn> </apply> </piece> <otherwise> <apply> <plus/> <apply> <times/> <cn>15.34</cn> <ci>Punktanzahl</ci> </apply> <apply> <times/> <cn>10.23</cn> <apply> <minus/> <ci>Punktanzahl</ci> <cn>1</cn> </apply> </apply> </apply> </otherwise> </piecewise>

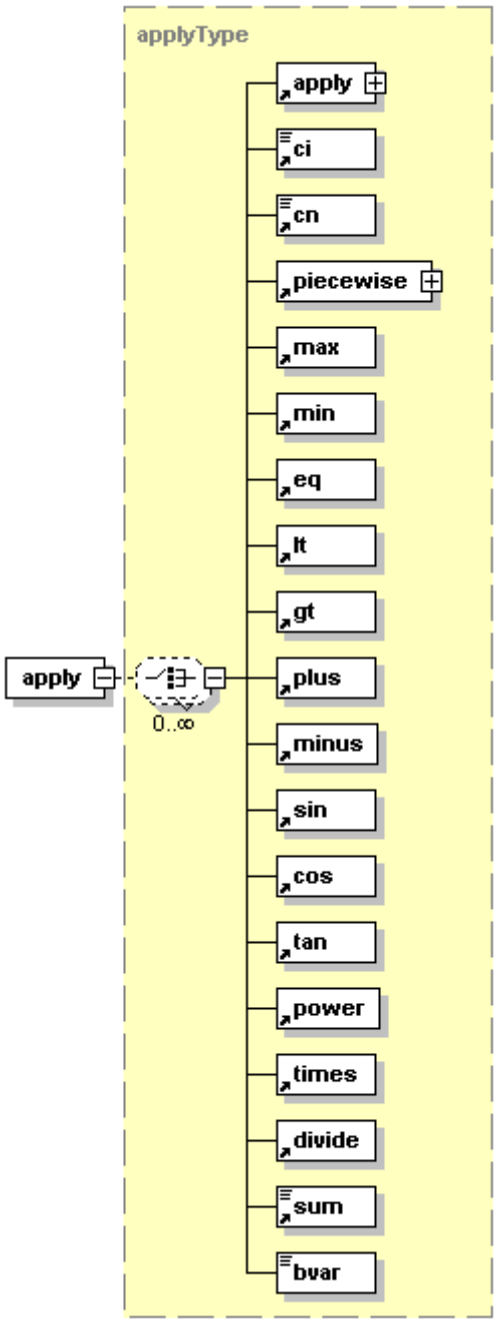
3.4.22 element piecewise/piece

Diagram	
Children	plus times cn ci apply gt lt

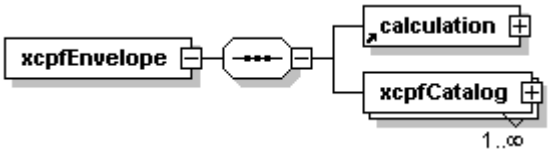
3.4.23 element piecewise/otherwise

Diagram	
Children	cn ci apply times

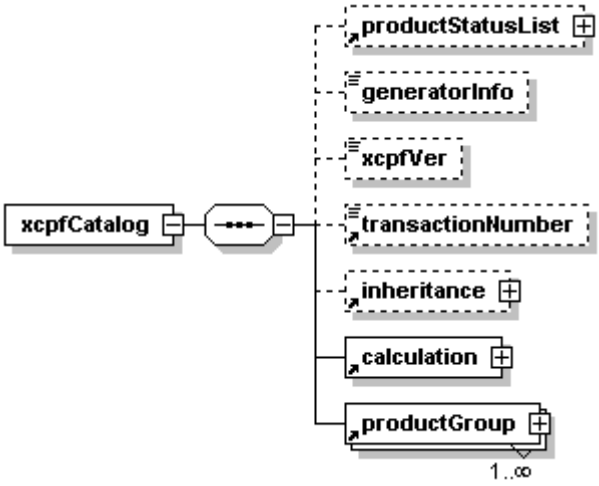
3.4.24 element piecewise/otherwise/apply

diagram	
type	applyType
children	apply ci cn piecewise max min eq lt gt plus minus sin cos tan power times divide sum bvar

3.5 element xcpfEnvelope

diagram					
children	calculation xcpfCatalog				
attributes	Name id name	Type xs:string xs:string	Use required	Default	Fixed
annotation	documentation	Envelope for multiple catalogs, e.g. cascading			

3.5.1 element xcpfEnvelope/xcpfCatalog

diagram					
children	productStatusList generatorInfo xcpfVer transactionNumber inheritance calculation productGroup				
attributes	Name id name	Type xs:string xs:string	Use required	Default	Fixed
annotation	documentation	Each supplier may have an own pricing catalog, wherein most standard entries may be inherited, e.g. contact address or licensing information			

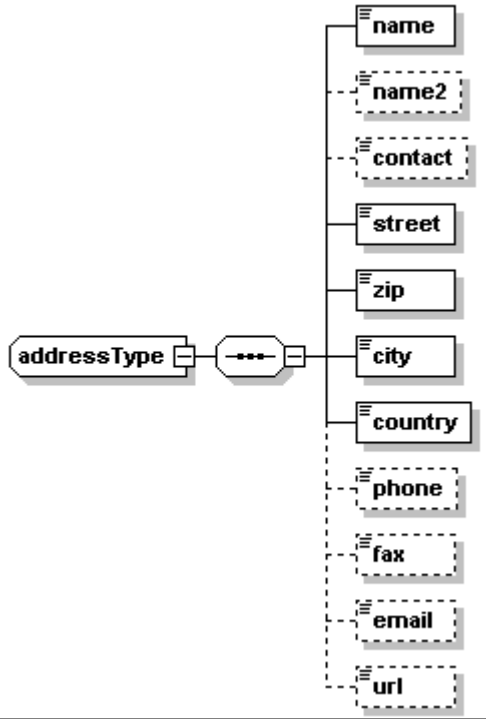
3.5.2 element xcpfEnvelope/xcpfCatalog/generatorInfo

diagram		
type	**xs:string**	
annotation	documentation	The editor or other information may be written down in this textfield

3.5.3 element xcpfEnvelope/xcpfCatalog/xcpfVer

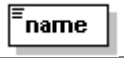
diagram	
type	**xs:string**
annotation	documentation Contains the used version of the XML complex Configuration & Pricing Format

3.6 complexType addressType

diagram	
children	**name name2 contact street zip city country phone fax email url**
used by	element **address**

attributes	Name	Type	Use	Default	Fixed
	role	xs:NMTOKEN	required		
	type	xs:NMTOKEN			

3.6.1 element addressType/name

diagram	
type	**xs:string**
annotation	documentation Name of person or institution.

3.6.2 element addressType/name2

diagram	
type	**xs:string**
annotation	documentation Space for additional names.

3.6.3 element addressType/contact

diagram	
type	**xs:string**
annotation	documentation This field may be use for personal names in institutions.

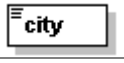
3.6.4 element addressType/street

diagram	
type	**xs:string**

3.6.5 element addressType/zip

diagram	
type	**xs:string**

3.6.6 element addressType/city

diagram	
type	**xs:string**

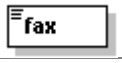
3.6.7 element addressType/country

diagram	
type	**xs:string**

3.6.8 element addressType/phone

diagram	
type	**xs:string**

3.6.9 element addressType/fax

diagram	
type	**xs:string**

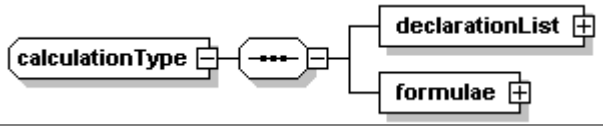
3.6.10 element addressType/email

diagram	
type	**xs:string**

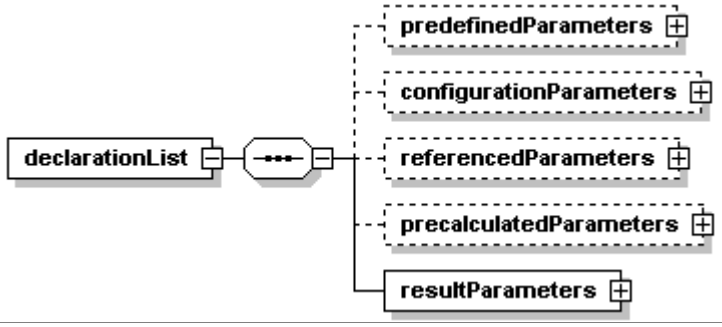
3.6.11 element addressType/url

diagram	
type	**xs:string**

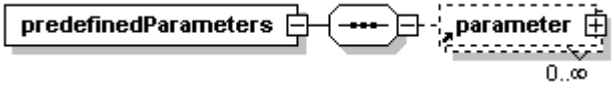
3.7 complexType calculationType

diagram	
children	declarationList formulae
used by	element calculation

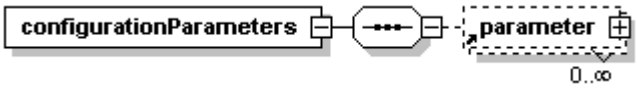
3.7.1 element calculationType/declarationList

diagram		
children	predefinedParameters configurationParameters referencedParameters precalculatedParameters resultParameters	
annotation	documentation	Parameter need to be declared prior processing. The input and output workflows can be determined by using categories.

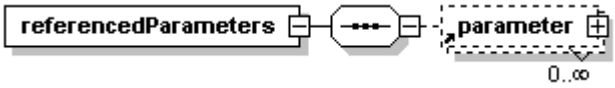
3.7.2 element calculationType/declarationList/predefinedParameters

diagram		
children	parameter	
annotation	documentation	Some parameters are necessary for the processing, but are constant, e.g. tax. These parameter can be declared as "predefined".

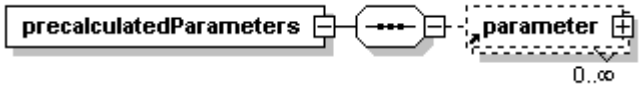
3.7.3 element calculationType/declarationList/configurationParameters

diagram		
children	parameter	
annotation	documentation	Other parameter values need to be set by user. All these parameters will be visualized. Some of these may be used for pricing, e.g. Contract time, other may be used for data generation, e.g. style=red and some for both, e.g. data format= dxf.

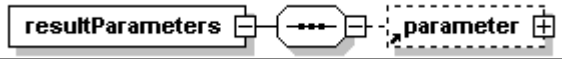
3.7.4 element calculationType/declarationList/referencedParameters

diagram		
children	parameter	
annotation	documentation	NOTE: Only used in productGroup! This parameter group is needed for hierarchical calculations, where parameter values of previous calculated values can be accessed. An often used example is the sum, where in previous prices are summarized.

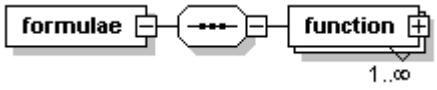
3.7.5 element calculationType/declarationList/precalculatedParameters

diagram		
children	**parameter**	
annotation	documentation	This kind of parameter are being used as sub functions. These functions may be mathematical operations or XCPF Web Service Calls (XCPF-WSC) and have only values at runtime. The XCPF-WSC are useful for access to mass storage, for complex calculations or for actual data. They are results of functions. An often used example is the calculation of a surface of a polygon.

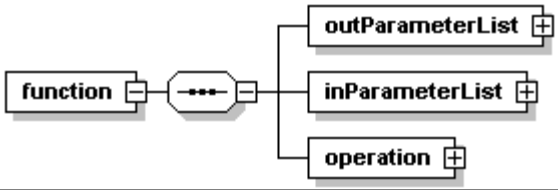
3.7.6 element calculationType/declarationList/resultParameters

diagram		
children	**parameter**	
annotation	documentation	This textfield contains the parameter for the final result of all calculations. An example is: price

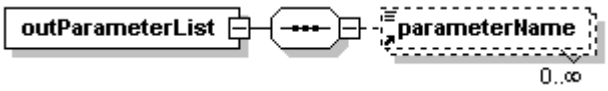
3.7.7 element calculationType/formulae

diagram		
children	**function**	
annotation	documentation	All declared parameters may be processed by formulae in this block

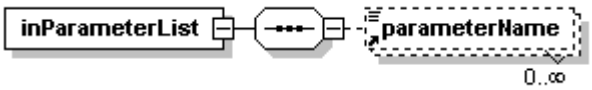
element **calculationType/formulae/function**

diagram		
children	**outParameterList** **inParameterList** **operation**	
attributes	Name: name Type: xs:string Use: Default: Fixed:	
annotation	documentation	The calculations may use several sub function or XPCF web Service Calls (XCPF-WSC) and a main function, which result need to be mapped to a parameter declared in the "resultParameters" block

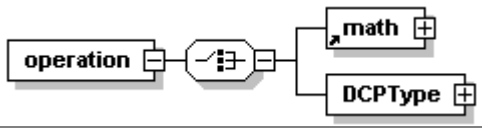
3.7.8 element calculationType/formulae/function/outParameterList

diagram		
children	parameterName	
annotation	documentation	This list contains all parameters, which will be used in the formula or in the Web Service Call

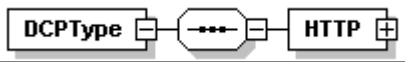
3.7.9 element calculationType/formulae/function/inParameterList

diagram		
children	parameterName	
annotation	documentation	This list contains the returned parameters, which are the results

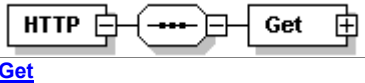
3.7.10 element calculationType/formulae/function/operation

diagram		
children	math DCPType	
annotation	documentation	The operation Block contains a: -mathematical forumula or a -XCPF Web Service Call Url

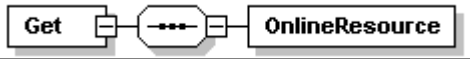
3.7.11 element calculationType/formulae/function/operation/DCPType

diagram		
children	HTTP	
annotation	documentation	XCPF Web Service Call for external processing

3.7.12 element calculationType/formulae/function/operation/DCPType/HTTP

diagram		
children	Get	

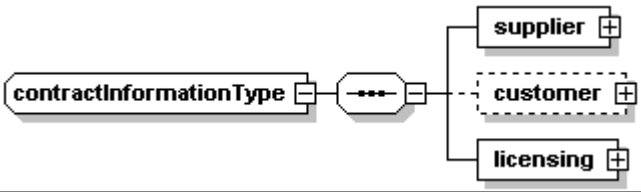
3.7.13 element calculationType/formulae/function/operation/DCPType/HTTP/Get

diagram	
children	OnlineResource
annotation	documentation HTTP Get Method

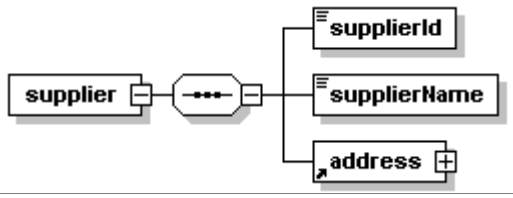
3.7.14 element calculationType/formulae/function/operation/DCPType/HTTP/Get/OnlineResource

diagram					
attributes	Name	Type	Use	Default	Fixed
	xlink:type	xlink:typeEnum			simple
	xlink:href	anyURI	required		
annotation	documentation URL, e.g. http://www.geo-ebusiness.de				

3.8 complexType contractInformationType

diagram	
children	supplier customer licensing
used by	element contractInformation

3.8.1 element contractInformationType/supplier

diagram	
children	supplierId supplierName address
annotation	documentation The party who is offering data products must be public.

3.8.2 element contractInformationType/supplier/supplierId

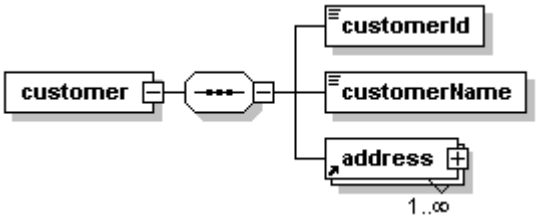
diagram	
type	**xs:string**

annotation	documentation	This ID may help to process orders and can help in a distributed environment an in the case of different spelling of names and addresses.

3.8.3 element contractInformationType/supplier/supplierName

diagram		
type	**xs:string**	
annotation	documentation	Short name of the data supplier.

3.8.4 element contractInformationType/customer

diagram		
children	**customerId customerName address**	
annotation	documentation	In opposite to the supplier, the customer may be anonymous until he orders with the WPOS method "orderproduct".

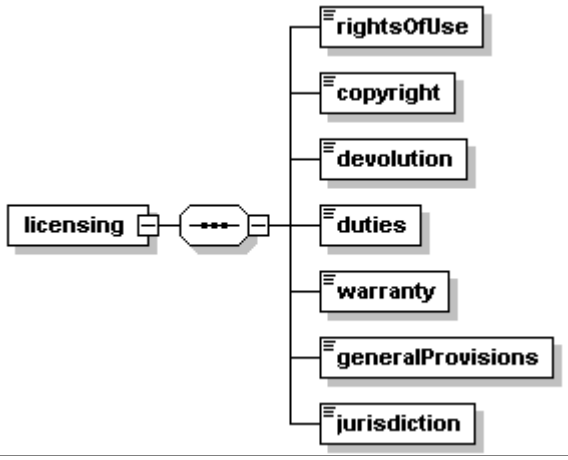
3.8.5 element contractInformationType/customer/customerId

diagram		
type	**xs:string**	
annotation	documentation	Even customer must have an account ID. This is necessary to link the stack of orders to a customer.

3.8.6 element contractInformationType/customer/customerName

diagram		
type	**xs:string**	
annotation	documentation	Short name of customer.

3.8.7 element contractInformationType/licensing

diagram					
children	rightsOfUse copyright devolution duties warranty generalProvisions jurisdiction				
attributes	Name	Type	Use	Default	Fixed
	licensingCat	xs:string	required		
annotation	documentation	Each licensing entry must have an ID. In future, this ID may stand for a special group of licensing, which may be processed automatically.			

3.8.8 element contractInformationType/licensing/rightsOfUse

diagram	
type	**xs:string**
annotation	documentation Licensing term

3.8.9 element contractInformationType/licensing/copyright

diagram	
type	**xs:string**

3.8.10 element contractInformationType/licensing/devolution

diagram	
type	**xs:string**

3.8.11 element contractInformationType/licensing/duties

diagram	

type	**xs:string**

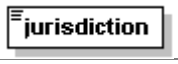
3.8.12 element contractInformationType/licensing/warranty

diagram	
type	**xs:string**

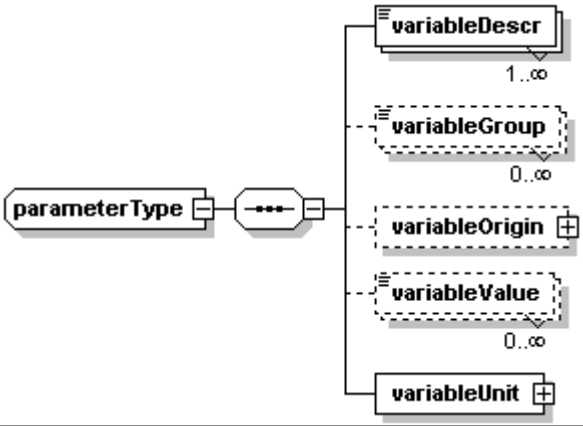
3.8.13 element contractInformationType/licensing/generalProvisions

diagram	
type	**xs:string**

3.8.14 element contractInformationType/licensing/jurisdiction

diagram	
type	**xs:string**

3.9 complexType parameterType

diagram	
children	variableDescr variableGroup variableOrigin variableValue variableUnit
used by	element parameter

attributes

Name	Type	Use	Default	Fixed
name	xs:string	required		
type	xs:NMTOKEN	required		

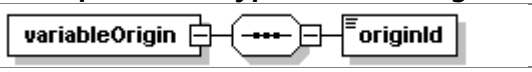
3.9.1 element parameterType/variableDescr

diagram					
type	extension of **xs:string**				
attributes	Name	Type	Use	Default	Fixed
	lang	xs:string	required		
annotation	documentation	Each parameter has a logical name. But at least for language reasons several different descriptions are useful. These descriptions may use white spaces and can contain sentences.			

3.9.2 element parameterType/variableGroup

diagram		
type	**xs:string**	
annotation	documentation	Typical some parameters may be used for some reasons as groups. The group relationship will be expressed by equal strings in the variableGroup field. Parameter may belong to more groups, e.g. for "pricing" and for generation "geoserver". An example is the use of a set of parameters for data generation. These parameters should contain a string, e.g. "geoserver". All the parameters with that string may be filtered and transferred to geo data generation server.

3.9.3 element parameterType/variableOrigin

diagram					
children	originId				
attributes	Name	Type	Use	Default	Fixed
	originName	xs:string	required		
annotation	documentation	NOTE: Variable Origin will only be used in "referencedParameters" blocks. The required attribute "orginName" contains the original name of a low hierarchical parameter. Referenced parameter can be used in to ways: -Multiple Reference with lists of parameter values -Single Reference An often used multiple example is the price calculation, which refer to the list of all previous results.			

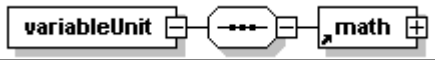
3.9.4 element parameterType/variableOrigin/originId

diagram		
type	**xs:string**	
annotation	documentation	Multiple references need a "*" as a wildcard for all parameter values with the in variable Origin used names, not depending on product entries

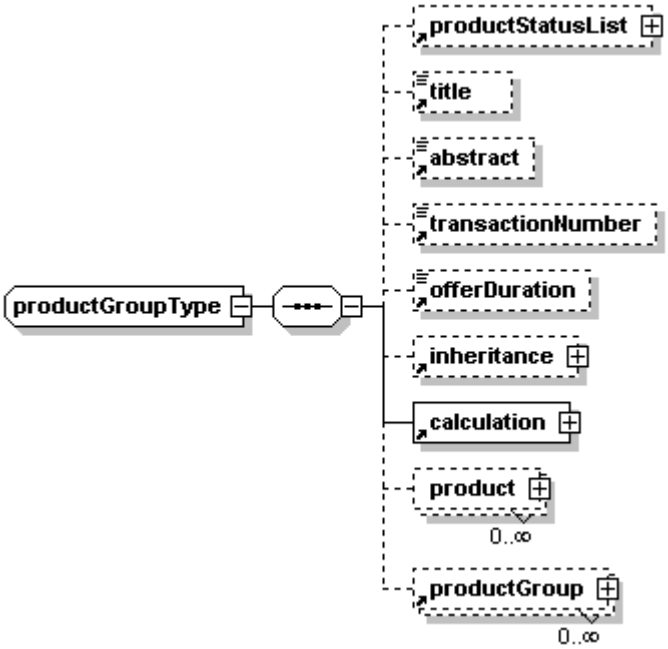
3.9.5 element parameterType/variableValue

diagram					
type	extension of **xs:string**				
attributes	Name	Type	Use	Default	Fixed
	condition	xs:string			
	selected	xs:string			
annotation	documentation	The need for a value is depending on the parametergroup of the declarationList: -predefinedParameters must a value, because they are constant -configurationParameters may have a value as a default -referencedParameters do not have a value -calcuationParameters do not have a value -resultParameters do not have a value			

3.9.6 element parameterType/variableUnit

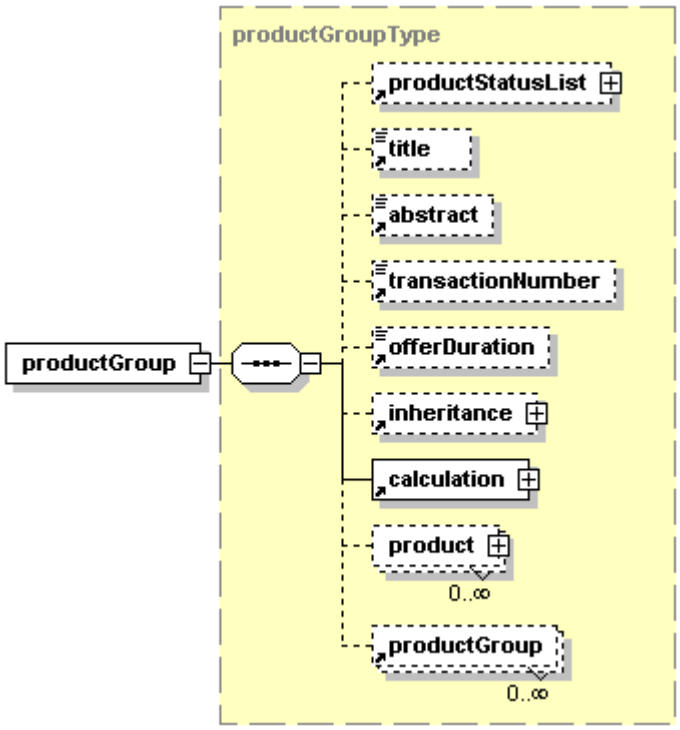
diagram					
children	math				
attributes	Name	Type	Use	Default	Fixed
	textstyle	xs:string	required		
annotation	documentation	Units are important for a correct calcuation. Therefore they have to be set in an engine processable way with MathML. But it might be neutral with a "1". They attribute textstyle should be used for string expressions, which may easly displayed. An example is: km^2			

3.10 complexType productGroupType

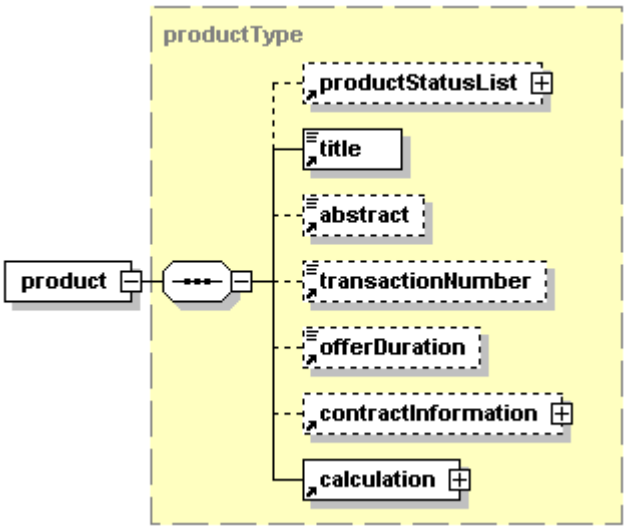
diagram		
children	productStatusList title abstract transactionNumber offerDuration inheritance calculation product productGroup	
used by	element	productGroup

attributes	Name	Type	Use	Default	Fixed
	id	xs:string	required		
	name	xs:string			

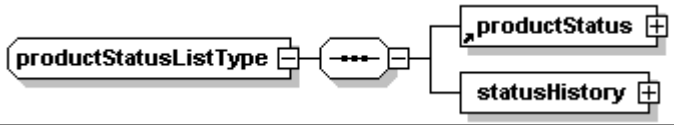
3.10.1 element productGroup

Diagram					
type	productGroupType				
children	productStatusList title abstract transactionNumber offerDuration inheritance calculation product productGroup				
used by	element	xcpfEnvelope/xcpfCatalog			
	complexType	productGroupType			
attributes	Name	Type	Use	Default	Fixed
	id	xs:string	required		
	name	xs:string			
annotation	documentation documentation	With the use of productGroup elements, pricing catalog can be arranged. With the use of productGroup elements, pricing catalog can be arranged.			

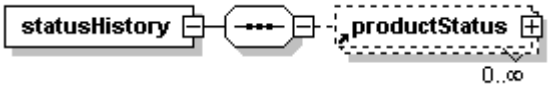
3.10.2 element productGroupType/product

diagram	
type	productType
children	productStatusList title abstract transactionNumber offerDuration contractInformation calculation
attributes	Name: id, name; Type: xs:string, xs:string; Use: required; Default: ; Fixed:
annotation	documentation: Important structure of the smallest unit, which has a complete calculation environment. The product block corresponds directly to data product and to its metadata

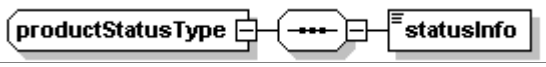
3.11 complexType productStatusListType

diagram	
children	productStatus statusHistory
used by	element productStatusList

3.11.1 element productStatusListType/statusHistory

diagram	
children	productStatus

3.11.2 complexType productStatusType

diagram	

children	**statusInfo**				
used by	element **productStatus**				
attributes	Name	Type	Use	Default	Fixed
	date	xs:string	required		
	time	xs:string	required		
	statusCode	xs:NMTOKEN	required		

3.11.3 element productStatusType/statusInfo

diagram	
type	**xs:string**
annotation	documentation Textual information about a status.

4 Examples Series

4.1 WPOS with Unknown Service Request

4.1.1 HTTP GET Request GetCapabilities

Service=WPOS&Request=getCapabilities

4.1.2 GetCapabilities Response

```
<?xml version="1.0" encoding="UTF-8"?>
<WPOS_Capabilities version="0.2.0" updateSequence="0">
    <Service>
        <Name>WPOS</Name>
        <Title>Web Pricing and Ordering Service</Title>
        <Abstract>Service for the configuration, pricing and ordering of geo products</Abstract>
        <KeywordList>
            <Keyword>price</Keyword>
            <Keyword>pricing</Keyword>
            <Keyword>order</Keyword>
        </KeywordList>
        <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple" xlink:href="http://www.geo-
ebusiness.de"/>
        <ContactInformation>
            <ContactPersonPrimary>
                <ContactPerson>Roland Wagner</ContactPerson>
                <ContactOrganization>Fraunhofer ISST</ContactOrganization>
            </ContactPersonPrimary>
            <ContactPosition>Scientific Assistant</ContactPosition>
            <ContactAddress>
                <AddressType>postal</AddressType>
                <Address>Fraunhofer ISST Emil-Figge-Str. 91</Address>
                <City>Dortmund</City>
                <StateOrProvince>NRW</StateOrProvince>
                <PostCode>44227</PostCode>
                <Country>Germany</Country>
            </ContactAddress>
            <ContactVoiceTelephone>+49 231 97 677 310</ContactVoiceTelephone>
            <ContactFacsimileTelephone>+49 231 97677 198 </ContactFacsimileTelephone>
            <ContactElectronicMailAddress>Roland.Wagner@isst.fhg.de</ContactElectronicMailAddress>
        </ContactInformation>
        <Fees>none</Fees>
        <AccessConstraints>Yes</AccessConstraints>
    </Service>
    <Capability>
        <Request>
            <GetCapabilities>
                <Format>only text</Format>
                <DCPType>
                    <HTTP>
                        <Get>
                            <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
xlink:href="http://127.0.0.1:8761/wpos/servlet/wpos.Controller?"/>
```

```
                        </Get>
                    </HTTP>
                </DCPType>
            </GetCapabilities>
            <GetPricingModel>
                <Format>only text</Format>
                <DCPType>
                    <HTTP>
                        <Get>
                            <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
xlink:href="http://127.0.0.1:8761/wpos/servlet/wpos.Controller?"/>
                        </Get>
                    </HTTP>
                </DCPType>
            </GetPricingModel>
            <GetPrice>
                <Format>only text</Format>
                <DCPType>
                    <HTTP>
                        <Get>
                            <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
xlink:href="http://127.0.0.1:8761/wpos/servlet/wpos.Controller?"/>
                        </Get>
                    </HTTP>
                </DCPType>
            </GetPrice>
            <OrderProduct>
                <Format>only text</Format>
                <DCPType>
                    <HTTP>
                        <Get>
                            <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
xlink:href="http://127.0.0.1:8761/wpos/servlet/wpos.Controller?"/>
                        </Get>
                    </HTTP>
                </DCPType>
            </OrderProduct>
            <GetProduct>
                <DCPType>
                    <HTTP>
                        <Get>
                            <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
xlink:href="http://127.0.0.1:8761/wpos/servlet/wpos.Controller?"/>
                        </Get>
                    </HTTP>
                </DCPType>
            </GetProduct>
            <GetOrderList>
                <DCPType>
                    <HTTP>
                        <Get>
                            <OnlineResource xmlns:xlink="http://www.w3.org/1999/xlink" xlink:type="simple"
xlink:href="http://127.0.0.1:8761/wpos/servlet/wpos.Controller?"/>
                        </Get>
                    </HTTP>
                </DCPType>
            </GetOrderList>
        </Request>
        <Exception>
            <Format>application/vnd.ogc.se_xml</Format>
        </Exception>
        <productGroup id="LVermA Brandenburg" name="Leistungs- und Entgeltverzeichnis von  LGB
(Landesvermessung und Geobasisinformation Brandenburg)">
```

```
            <productGroup id="1" name="">
                <product id="1513" name="Demodata A"/>
                <product id="1012" name="Demodata B"/>
            </productGroup>
            <productGroup id="2" name="">
                <product id="505" name="Demodata C"/>
            </productGroup>
        </productGroup>
        <VendorSpecificCapabilities/>
    </Capability>
</WPOS_Capabilities>
```

4.1.3 HTTP GET GetPriceModel Request

REQUEST=GetPriceModel&PRODUCTID=1513,1012

4.1.4 GetPriceModel Response XCPF

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v4.1 U (http://www.xmlspy.com) by Hr. Wagner (Fraunhofer Institut Software u. Systemtechnik) --
>
<xcpfEnvelope id="de.lverma-bbEnvelope">
    <calculation>
        <declarationList>
            <referencedParameters>
                <parameter name="singlePrice" type="real">
                    <variableDescr lang="de">Preis</variableDescr>
                    <variableOrigin originName="price">
                        <originId>*</originId>
                    </variableOrigin>
                    <variableValue>2</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </referencedParameters>
            <resultParameters>
                <parameter name="price" type="real">
                    <variableDescr lang="de"> Preis </variableDescr>
                    <variableValue/>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </resultParameters>
        </declarationList>
        <formulae>
            <function name="Gesamtsumme">
                <outParameterList>
                    <parameterName>singlePrice</parameterName>
```

```
            </outParameterList>
            <inParameterList>
                <parameterName>price</parameterName>
            </inParameterList>
            <operation>
                <math>
                    <apply>
                        <eq/>
                        <ci>price</ci>
                        <apply>
                            <sum/>
                            <bvar>singlePrice</bvar>
                            <ci>singlePrice</ci>
                            <!--ci>singlePrice</ci-->
                        </apply>
                    </apply>
                </math>
            </operation>
        </function>
    </formulae>
</calculation>
<xcpfCatalog id="de.lverma-bbCatalog">
    <calculation>
        <declarationList>
            <referencedParameters>
                <parameter name="singlePrice" type="real">
                    <variableDescr lang="de">Preis</variableDescr>
                    <variableOrigin originName="price">
                        <originId>*</originId>
                    </variableOrigin>
                    <variableValue>2</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </referencedParameters>
            <resultParameters>
                <parameter name="price" type="real">
                    <variableDescr lang="de"> Preis </variableDescr>
                    <variableValue/>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </resultParameters>
        </declarationList>
        <formulae>
            <function name="Gesamtsumme">
                <outParameterList>
                    <parameterName>singlePrice</parameterName>
                </outParameterList>
                <inParameterList>
                    <parameterName>price</parameterName>
                </inParameterList>
                <operation>
```

```
                    <math>
                        <apply>
                            <eq/>
                            <ci>price</ci>
                            <apply>
                                <sum/>
                                <bvar>singlePrice</bvar>
                                <ci>singlePrice</ci>
                                <!--ci>singlePrice</ci-->
                            </apply>
                        </apply>
                    </math>
                </operation>
            </function>
        </formulae>
    </calculation>
    <productGroup id="LVermA Brandenburg" name="">
        <generatorInfo>Roland Wagner</generatorInfo>
        <xcpfVer>0.3.0</xcpfVer>
        <title>Leistungs- und Entgeltverzeichnis von  LGB (Landesvermessung und Geobasisinformation
Brandenburg)</title>
        <abstract/>
        <inheritance>
            <contractInformation>
                <supplier>
                    <supplierId>de.lverma-bb</supplierId>
                    <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                    <address role="supplier">
                        <name>Landesvermessungsamt Brandenburg</name>
                        <name2/>
                        <contact>Kundendienst</contact>
                        <street>Am Vermessungsamt 1</street>
                        <zip>44227</zip>
                        <city>Potsdam</city>
                        <country>Germany</country>
                        <phone>+49 231 97 00 7 00</phone>
                        <fax>+49 231 97 00 798</fax>
                        <email>info@lverm-bb.de</email>
                        <url>http://www.lverm-bb.de</url>
                    </address>
                </supplier>
                <licensing licensingCat="de.lverma-bb">
                    <rightsOfUse>
```

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```
                    </rightsOfUse>
                    <copyright>
```

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```
                    </copyright>
                    <devolution>
```

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```
                    </devolution>
```

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<jurisdiction>
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</jurisdiction>
</licensing>
</contractInformation>
</inheritance>
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<declarationList>
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<parameter name="singlePrice" type="real">
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</variableOrigin>
<variableValue>2</variableValue>
<variableUnit textstyle="Euro">
<math>
<apply>
<ci>Euro</ci>
</apply>
</math>
</variableUnit>
</parameter>
</referencedParameters>
<resultParameters>
<parameter name="price" type="real">
<variableDescr lang="de"> Preis </variableDescr>
<variableValue/>
<variableUnit textstyle="Euro">
<math>
<apply>
<ci>Euro</ci>
</apply>
</math>
</variableUnit>
</parameter>

```
                </resultParameters>
            </declarationList>
            <formulae>
                <function name="Gesamtsumme">
                    <outParameterList>
                        <parameterName>singlePrice</parameterName>
                    </outParameterList>
                    <inParameterList>
                        <parameterName>price</parameterName>
                    </inParameterList>
                    <operation>
                        <math>
                            <apply>
                                <eq/>
                                <ci>price</ci>
                                <apply>
                                    <sum/>
                                    <bvar>singlePrice</bvar>
                                    <ci>singlePrice</ci>
                                    <!--ci>singlePrice</ci-->
                                </apply>
                            </apply>
                        </math>
                    </operation>
                </function>
            </formulae>
        </calculation>
        <productGroup id="1" name="Geodaetische Basisdaten">
            <contractInformation>
                <supplier>
                    <supplierId>de.lverma-bb</supplierId>
                    <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                    <address role="supplier">
                        <name>Landesvermessungsamt Brandenburg</name>
                        <name2/>
                        <contact>Kundendienst</contact>
                        <street>Am Vermessungsamt 1</street>
                        <zip>44227</zip>
                        <city>Potsdam</city>
                        <country>Germany</country>
                        <phone>+49 231 97 00 7 00</phone>
                        <fax>+49 231 97 00 798</fax>
                        <email>info@lverm-bb.de</email>
                        <url>http://www.lverm-bb.de</url>
                    </address>
                </supplier>
                <licensing licensingCat="de.lverma-bb">
                    <rightsOfUse>
```

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```
                    </rightsOfUse>
                    <copyright>
```

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                    </copyright>
                    <devolution>
```

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</devolution>

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</jurisdiction>

```
                    </licensing>
                </contractInformation>
                <calculation>
                    <declarationList>
                        <referencedParameters>
                            <parameter name="singlePrice" type="real">
                                <variableDescr lang="de">Preis</variableDescr>
                                <variableOrigin originName="price">
                                    <originId>*</originId>
                                </variableOrigin>
                                <variableValue>2</variableValue>
                                <variableUnit textstyle="Euro">
                                    <math>
                                        <apply>
                                            <ci>Euro</ci>
                                        </apply>
                                    </math>
                                </variableUnit>
                            </parameter>
                        </referencedParameters>
                        <resultParameters>
                            <parameter name="price" type="real">
                                <variableDescr lang="de"> Preis </variableDescr>
                                <variableValue/>
                                <variableUnit textstyle="Euro">
                                    <math>
                                        <apply>
                                            <ci>Euro</ci>
```

```
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                    </resultParameters>
                </declarationList>
                <formulae>
                    <function name="Gesamtsumme">
                        <outParameterList>
                            <parameterName>singlePrice</parameterName>
                        </outParameterList>
                        <inParameterList>
                            <parameterName>price</parameterName>
                        </inParameterList>
                        <operation>
                            <math>
                                <apply>
                                    <eq/>
                                    <ci>price</ci>
                                    <apply>
                                        <sum/>
                                        <bvar>singlePrice</bvar>
                                        <ci>singlePrice</ci>
                                        <!--ci>singlePrice</ci-->
                                    </apply>
                                </apply>
                            </math>
                        </operation>
                    </function>
                </formulae>
            </calculation>
            <product id="1513">
                <title>Demodata A</title>
                <abstract>Demodata</abstract>
                <contractInformation>
                    <supplier>
                        <supplierId>de.lverma-bb</supplierId>
                        <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                        <address role="supplier">
                            <name>Landesvermessungsamt Brandenburg</name>
                            <name2/>
                            <contact>Kundendienst</contact>
                            <street>Am Vermessungsamt 1</street>
                            <zip>44227</zip>
                            <city>Potsdam</city>
                            <country>Germany</country>
                            <phone>+49 231 97 00 7 00</phone>
                            <fax>+49 231 97 00 798</fax>
                            <email>info@lverm-bb.de</email>
                            <url>http://www.lverm-bb.de</url>
                        </address>
                    </supplier>
                    <licensing licensingCat="de.lverma-bb">
                        <rightsOfUse>
```

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```
                        </rightsOfUse>
                        <copyright>
```

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<devolution>
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</devolution>
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</duties>
<warranty>
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</warranty>
<generalProvisions>
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Bestimmungen nicht ber□Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine solche zu ersetzten,
die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.
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</generalProvisions>
<jurisdiction>
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</jurisdiction>

```
            </licensing>
        </contractInformation>
        <calculation>
            <declarationList>
                <predefinedParameters>
                    <parameter name="pricePerPunkt" type="real">
                        <variableDescr lang="de"> Preis pro Punkt</variableDescr>
                        <variableDescr lang="en"> Price per Point</variableDescr>
                        <variableValue>15.34</variableValue>
                        <variableUnit textstyle="Euro/Punkt">
                            <math>
                                <apply>
                                    <divide/>
                                    <ci>Euro</ci>
                                    <ci>Punkt</ci>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>
                </predefinedParameters>
                <configurationParameters>
                    <parameter name="ArtikelID" type="string">
```

```
        <variableDescr lang="de">ArtikelID</variableDescr>
        <variableDescr lang="en">ArticelID</variableDescr>
        <variableValue/>
        <variableUnit textstyle="">
            <math>
                <apply>
                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="ArtikelName" type="string">
        <variableDescr lang="de">ArtikelName</variableDescr>
        <variableDescr lang="en">Articelname</variableDescr>
        <variableValue/>
        <variableUnit textstyle="">
            <math>
                <apply>
                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="Punktanzahl" type="integer">
        <variableGroup>server</variableGroup>
        <variableDescr lang="de"> Anzahl der Punkte </variableDescr>
        <variableDescr lang="en">Number of Points</variableDescr>
        <variableValue/>
        <variableUnit textstyle="">
            <math>
                <apply>
                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="Polygon" type="string">
        <variableGroup>server</variableGroup>
        <variableDescr lang="de">Polygon</variableDescr>
        <variableDescr lang="en">Polygon</variableDescr>
        <variableValue/>
        <variableUnit textstyle="">
            <math>
                <apply>
                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="Area" type="real">
        <variableGroup>server</variableGroup>
        <variableDescr lang="de">Fl□e</variableDescr>
        <variableDescr lang="en">Surface</variableDescr>
        <variableValue/>
        <variableUnit textstyle="m²">
            <math>
                <apply>
                    <power/>
                    <ci>m</ci>
                    <cn>2</cn>
                </apply>
            </math>
        </variableUnit>
```

```
            </parameter>
        </configurationParameters>
        <resultParameters>
            <parameter name="price" type="real">
                <variableDescr lang="de"> Preis </variableDescr>
                <variableDescr lang="en">Price</variableDescr>
                <variableValue/>
                <variableUnit textstyle="Euro">
                    <math>
                        <apply>
                            <ci>Euro</ci>
                        </apply>
                    </math>
                </variableUnit>
            </parameter>
        </resultParameters>
    </declarationList>
    <formulae>
        <function name="Hauptformel19">
            <outParameterList>
                <parameterName>Punktanzahl</parameterName>
                <parameterName>pricePerPunkt</parameterName>
            </outParameterList>
            <inParameterList>
                <parameterName>price</parameterName>
            </inParameterList>
            <operation>
                <math>
                    <apply>
                        <eq/>
                        <ci> price </ci>
                        <piecewise>
                            <piece>
                                <apply>
                                    <times/>
                                    <cn>15.34</cn>
                                    <ci>Punktanzahl</ci>
                                </apply>
                                <apply>
                                    <lt/>
                                    <ci>Punktanzahl</ci>
                                    <cn>2</cn>
                                </apply>
                            </piece>
                            <otherwise>
                                <apply>
                                    <plus/>
                                    <apply>
                                        <times/>
                                        <cn>15.34</cn>
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                                    </apply>
                                    <apply>
                                        <times/>
                                        <cn>10.23</cn>
                                        <apply>
                                            <minus/>
                                            <ci>Punktanzahl</ci>
                                            <cn>1</cn>
                                        </apply>
                                    </apply>
                                </apply>
                            </otherwise>
```

```
                                    </piecewise>
                                </apply>
                            </math>
                        </operation>
                    </function>
                </formulae>
            </calculation>
        </product>
        <product id="1012">
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            <abstract>Demodata</abstract>
            <contractInformation>
                <supplier>
                    <supplierId>de.lverma-bb</supplierId>
                    <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                    <address role="supplier">
                        <name>Landesvermessungsamt Brandenburg</name>
                        <name2/>
                        <contact>Kundendienst</contact>
                        <street>Am Vermessungsamt 1</street>
                        <zip>44227</zip>
                        <city>Potsdam</city>
                        <country>Germany</country>
                        <phone>+49 231 97 00 7 00</phone>
                        <fax>+49 231 97 00 798</fax>
                        <email>info@lverm-bb.de</email>
                        <url>http://www.lverm-bb.de</url>
                    </address>
                </supplier>
                <licensing licensingCat="de.lverma-bb">
                    <rightsOfUse>
```

Die Institution ISST gew□t der Partnerfirma eine unbefristete, nicht ausschliessliche, eingeschr□te Nutzung.
Hierzu r□t das ISST einer Partnerfirma das Recht ein, die Demodaten in Datenbanken zu speichern, zu bearbeiten, zu kopieren und ausschliesslich im Internet zu nutzen.
Die Demodaten sind ausschliesslich zu eigenen Nutzung bestimmt. Der Erwerb oder Dienstleistung f□tte ist ausgeschlossen.
Die Nutzungsrechte beziehen sich ausschliesslich auf die Nutzing der o.g. Daten.

```
                    </rightsOfUse>
                    <copyright>
```

Das ISST versichert, dass an den von ISST zur Verf□gestellten Daten keine Rechte Dritter im Sinner eines Datenbankurheberrechtsschutzes gem. § 87 a ff. UrhG bestehen. Das ISSt stellt der Partnerfirma insoweit von Anspr□Dritter frei.
Sollte ein ordentliches Gericht oder ein gerichtlicher oder aussergerichtlicher Vergleich zu einer anderen Auffassung kommen, haftet das ISST nicht.

```
                    </copyright>
                    <devolution>
```

Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu □agen, sofern dies nicht ausdr□h genhemigt ist.
F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.

```
                    </devolution>
                    <duties>
```

Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft einzurichten und aufrecht zu halten.
Die Nutzung der Daten im Internet gestattet ISST der Parnerfirma unter folgenden Voraussetzungen :
- Quellenangabe : © ‹ ‹ Jahr › › ISST, Berlin/Dortmund
- Link auf die Homepage vom ISST : www.isst.fhg.de
- Schutz der Daten gegen Auslesen / Downloaden

Eine Weitergabe an Kunden zwecks Internetnutzung bedarf der vorherigen individuellen Vereinbarung mit dem ISST.

```
                    </duties>
                    <warranty>
```

Das ISST garantiert nicht, dass die Datenprodukte den Bed□sen oder Erwartungen des Endnutzers entsprechen werden. Da die Datenprodukte

u.a. auch aus □ntlichen Verzeichnissen und Registern zusammengestllt werden, kann das ISST trotz st□iger Vergleichskontrollen die
Richtigkeit und Vollst□igkeit nicht gew□leisten.
</warranty>
<generalProvisions>
Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein, so wird dadurch die G□eit der □n
Bestimmungen nicht ber□Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine solche zu ersetzten,
die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.
M□he Nebenabreden haben die Parteien nicht getroffen. S□liche □erungen und Erg□ungen dieser Vereinbarung bef□der Schriftform.
Auf alle Rechtsbeziehungen zu uns findet ausschliesslich deutsches Recht Anwendung.
</generalProvisions>
<jurisdiction>
Ist der Kunde Vollkaufmann, so wird f□e Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand vereinbart.
</jurisdiction>
</licensing>
</contractInformation>
<calculation>
<declarationList>
<predefinedParameters>
<parameter name="kindofproduct" type="string">
<variableDescr lang="de">Art des Produkts</variableDescr>
<variableDescr lang="en">Kind of Product</variableDescr>
<variableValue>analog</variableValue>
<variableUnit textstyle="">
<math>
<apply>
<divide/>
<ci>Euro</ci>
<ci>Punkt</ci>
</apply>
</math>
</variableUnit>
</parameter>
<parameter name="pricePerBlatt" type="real">
<variableDescr lang="de"> Preis pro Blatt</variableDescr>
<variableDescr lang="en"> Price per Page</variableDescr>
<variableValue>20.45</variableValue>
<variableUnit textstyle="Euro/Punkt">
<math>
<apply>
<divide/>
<ci>Euro</ci>
<ci>Punkt</ci>
</apply>
</math>
</variableUnit>
</parameter>
</predefinedParameters>
<configurationParameters>
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<variableDescr lang="de">ArtikelID</variableDescr>
<variableDescr lang="en">ArticelID</variableDescr>
<variableValue/>
<variableUnit textstyle="">
<math>
<apply>
<cn>1</cn>
</apply>
</math>

```
    </variableUnit>
</parameter>
<parameter name="ArtikelName" type="string">
    <variableDescr lang="de">ArtikelName</variableDescr>
    <variableDescr lang="en">Articelname</variableDescr>
    <variableValue/>
    <variableUnit textstyle="">
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            <apply>
                <cn>1</cn>
            </apply>
        </math>
    </variableUnit>
</parameter>
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    <variableGroup>server</variableGroup>
    <variableDescr lang="de">Polygon</variableDescr>
    <variableDescr lang="en">Polygon</variableDescr>
    <variableValue/>
    <variableUnit textstyle="">
        <math>
            <apply>
                <cn>1</cn>
            </apply>
        </math>
    </variableUnit>
</parameter>
<parameter name="Area" type="real">
    <variableGroup>server</variableGroup>
    <variableDescr lang="de">Fl□e</variableDescr>
    <variableDescr lang="en">Surface</variableDescr>
    <variableValue/>
    <variableUnit textstyle="m²">
        <math>
            <apply>
                <power/>
                <ci>m</ci>
                <cn>2</cn>
            </apply>
        </math>
    </variableUnit>
</parameter>
<parameter name="Punktanzahl" type="integer">
    <variableGroup>server</variableGroup>
    <variableDescr lang="de">Anzahl der Punkte </variableDescr>
    <variableDescr lang="en">Number of Points </variableDescr>
    <variableValue/>
    <variableUnit textstyle="">
        <math>
            <apply>
                <cn>1</cn>
            </apply>
        </math>
    </variableUnit>
</parameter>
<parameter name="Blaetteranzahl" type="integer">
    <variableGroup>server</variableGroup>
    <variableDescr lang="de">Anzahl der Blaetter </variableDescr>
    <variableDescr lang="en">Number of Pages</variableDescr>
    <variableValue/>
    <variableUnit textstyle="">
        <math>
            <apply>
```

```
                                    <cn>1</cn>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>
                </configurationParameters>
                <resultParameters>
                    <parameter name="price" type="real">
                        <variableDescr lang="de">Preis </variableDescr>
                        <variableDescr lang="en">Price </variableDescr>
                        <variableValue/>
                        <variableUnit textstyle="Euro">
                            <math>
                                <apply>
                                    <ci>Euro</ci>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>
                </resultParameters>
            </declarationList>
            <formulae>
                <function name="Hauptformel20">
                    <outParameterList>
                        <parameterName>Blaetteranzahl</parameterName>
                        <parameterName>pricePerBlatt</parameterName>
                        <parameterName>Punktanzahl</parameterName>
                    </outParameterList>
                    <inParameterList>
                        <parameterName>price</parameterName>
                    </inParameterList>
                    <operation>
                        <math>
                            <apply>
                                <eq/>
                                <ci> price </ci>
                                <apply>
                                    <times/>
                                    <ci>pricePerBlatt</ci>
                                    <ci>Blaetteranzahl</ci>
                                    <ci>Punktanzahl</ci>
                                </apply>
                            </apply>
                        </math>
                    </operation>
                </function>
            </formulae>
        </calculation>
    </product>
</productGroup>
</productGroup>
</xcpfCatalog>
</xcpfEnvelope>
```

4.1.5 HTTP GET GetPrice Request

REQUEST=GetPrice&**PRODUCTID**=1513,1012&**SERVICEREQUEST**=,&**CONFIGPARAMS**=ArtikelID%3D1513%26Polygon%3D330850%3A5763900%2C3330950%3A576

3900%2C3330950%3A5764000%2C3330850%3A5764000%2C3330850%3A5763
90%26Area%3D1000%26ArtikelName%3Dtest%26Punktanzahl%3D25,ArtikelID%3
D1012%26Blaetteranzahl%3D3%26Polygon%3D3330850%3A5763900%2C333095
0%3A5763900%2C3330950%3A5764000%2C3330850%3A5764000%2C3330850
%3A576390%26Area%3D1000%26ArtikelName%3D test%26Punktanzahl%3D25
SERVICEPROTOCOL=,

4.1.6 GetPrice Response XCPF

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v4.1 U (http://www.xmlspy.com) by Hr. Wagner (Fraunhofer Institut Software u. Systemtechnik) --
>
<xcpfEnvelope id="de.lverma-bbEnvelope">
    <calculation>
        <declarationList>
            <referencedParameters>
                <parameter name="singlePrice" type="real">
                    <variableDescr lang="de">Preis</variableDescr>
                    <variableOrigin originName="price">
                        <originId>*</originId>
                    </variableOrigin>
                    <variableValue>2</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </referencedParameters>
            <resultParameters>
                <parameter name="price" type="real">
                    <variableDescr lang="de"> Preis </variableDescr>
                    <variableValue>2162.77</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </resultParameters>
        </declarationList>
        <formulae>
            <function name="Gesamtsumme">
                <outParameterList>
                    <parameterName>singlePrice</parameterName>
                </outParameterList>
                <inParameterList>
                    <parameterName>price</parameterName>
                </inParameterList>
                <operation>
                    <math>
                        <apply>
                            <eq/>
                            <ci>price</ci>
                            <apply>
                                <sum/>
                                <bvar>singlePrice</bvar>
```

```
                        <ci>singlePrice</ci>
                        <!--ci>singlePrice</ci-->
                    </apply>
                </apply>
            </math>
        </operation>
    </function>
</formulae>
</calculation>
<xcpfCatalog id="de.lverma-bbCatalog">
    <calculation>
        <declarationList>
            <referencedParameters>
                <parameter name="singlePrice" type="real">
                    <variableDescr lang="de">Preis</variableDescr>
                    <variableOrigin originName="price">
                        <originId>*</originId>
                    </variableOrigin>
                    <variableValue>2</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </referencedParameters>
            <resultParameters>
                <parameter name="price" type="real">
                    <variableDescr lang="de"> Preis </variableDescr>
                    <variableValue>2162.77</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </resultParameters>
        </declarationList>
        <formulae>
            <function name="Gesamtsumme">
                <outParameterList>
                    <parameterName>singlePrice</parameterName>
                </outParameterList>
                <inParameterList>
                    <parameterName>price</parameterName>
                </inParameterList>
                <operation>
                    <math>
                        <apply>
                            <eq/>
                            <ci>price</ci>
                            <apply>
                                <sum/>
                                <bvar>singlePrice</bvar>
                                <ci>singlePrice</ci>
                                <!--ci>singlePrice</ci-->
                            </apply>
                        </apply>
                    </math>
```

```
                    </operation>
                </function>
            </formulae>
        </calculation>
        <productGroup id="LVermA Brandenburg" name="">
            <generatorInfo>Roland Wagner</generatorInfo>
            <xcpfVer>0.3.0</xcpfVer>
            <title>Leistungs- und Entgeltverzeichnis von  LGB (Landesvermessung und Geobasisinformation
Brandenburg)</title>
            <abstract/>
            <inheritance>
                <contractInformation>
                    <supplier>
                        <supplierId>de.lverma-bb</supplierId>
                        <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                        <address role="supplier">
                            <name>Landesvermessungsamt Brandenburg</name>
                            <name2/>
                            <contact>Kundendienst</contact>
                            <street>Am Vermessungsamt 1</street>
                            <zip>44227</zip>
                            <city>Potsdam</city>
                            <country>Germany</country>
                            <phone>+49 231 97 00 7 00</phone>
                            <fax>+49 231 97 00 798</fax>
                            <email>info@lverm-bb.de</email>
                            <url>http://www.lverm-bb.de</url>
                        </address>
                    </supplier>
                    <licensing licensingCat="de.lverma-bb">
                        <rightsOfUse>
    Die Institution ISST gew□t der Partnerfirma eine unbefristete, nicht ausschliessliche, eingeschr□te Nutzung.
    Hierzu r□t das ISST einer Partnerfirma das Recht ein, die Demodaten in Datenbanken zu speichern, zu bearbeiten,
    zu kopieren und ausschliesslich im Internet zu nutzen.
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ausgeschlossen.
    Die Nutzungsrechte beziehen sich ausschliesslich auf die Nutzing der o.g. Daten.
  </rightsOfUse>
                        <copyright>
    Das ISST versichert, dass an den von ISST zur Verf□gestellten Daten keine Rechte Dritter im Sinner eines
    Datenbankurheberrechtsschutzes gem. § 87 a ff. UrhG bestehen. Das ISSt stellt der Partnerfirma insoweit von
Anspr□Dritter frei.
    Sollte ein ordentliches Gericht oder ein gerichtlicher oder aussergerichtlicher Vergleich zu einer anderen Auffassung
kommen, haftet das ISST nicht.
  </copyright>
                        <devolution>
    Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu □agen, sofern
dies nicht ausdr□h genhemigt ist.
    F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM
50.000,- zu zahlen.
  </devolution>
                        <duties>
    Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft einzurichten und
aufrecht zu halten.
    Die Nutzung der Daten im Internet gestattet ISST der Parnerfirma unter folgenden Voraussetzungen :
     - Quellenangabe : © ‹ ‹ Jahr › › ISST, Berlin/Dortmund
     - Link auf die Homepage vom ISST : www.isst.fhg.de
     - Schutz der Daten gegen Auslesen / Downloaden
    Eine Weitergabe an Kunden zwecks Internetnutzung bedarf der vorherigen individuellen Vereinbarung mit dem ISST.
  </duties>
                        <warranty>
    Das ISST garantiert nicht, dass die Datenprodukte den Bed□sen oder Erwartungen des Endnutzers entsprechen
werden. Da die Datenprodukte
```

u.a. auch aus □ntlichen Verzeichnissen und Registern zusammengestllt werden, kann das ISST trotz st□iger Vergleichskontrollen die
Richtigkeit und Vollst□igkeit nicht gew□leisten.
</warranty>
<generalProvisions>
Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein, so wird dadurch die G□eit der □n
Bestimmungen nicht ber□Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine solche zu ersetzten,
die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.
M□he Nebenabreden haben die Parteien nicht getroffen. S□liche □erungen und Erg□ungen dieser Vereinbarung bef□der Schriftform.
Auf alle Rechtsbeziehungen zu uns findet ausschliesslich deutsches Recht Anwendung.
</generalProvisions>
<jurisdiction>
Ist der Kunde Vollkaufmann, so wird f□e Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand vereinbart.
</jurisdiction>
</licensing>
</contractInformation>
</inheritance>
<calculation>
<declarationList>
<referencedParameters>
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<variableDescr lang="de">Preis</variableDescr>
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<originId>*</originId>
</variableOrigin>
<variableValue>2</variableValue>
<variableUnit textstyle="Euro">
<math>
<apply>
<ci>Euro</ci>
</apply>
</math>
</variableUnit>
</parameter>
</referencedParameters>
<resultParameters>
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<variableValue>2162.77</variableValue>
<variableUnit textstyle="Euro">
<math>
<apply>
<ci>Euro</ci>
</apply>
</math>
</variableUnit>
</parameter>
</resultParameters>
</declarationList>
<formulae>
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<outParameterList>
<parameterName>singlePrice</parameterName>
</outParameterList>
<inParameterList>
<parameterName>price</parameterName>
</inParameterList>
<operation>
<math>

```
                                <apply>
                                    <eq/>
                                    <ci>price</ci>
                                    <apply>
                                        <sum/>
                                        <bvar>singlePrice</bvar>
                                        <ci>singlePrice</ci>
                                        <!--ci>singlePrice</ci-->
                                    </apply>
                                </apply>
                            </math>
                        </operation>
                    </function>
                </formulae>
            </calculation>
            <productGroup id="1" name="Geodaetische Basisdaten">
                <contractInformation>
                    <supplier>
                        <supplierId>de.lverma-bb</supplierId>
                        <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                        <address role="supplier">
                            <name>Landesvermessungsamt Brandenburg</name>
                            <name2/>
                            <contact>Kundendienst</contact>
                            <street>Am Vermessungsamt 1</street>
                            <zip>44227</zip>
                            <city>Potsdam</city>
                            <country>Germany</country>
                            <phone>+49 231 97 00 7 00</phone>
                            <fax>+49 231 97 00 798</fax>
                            <email>info@lverm-bb.de</email>
                            <url>http://www.lverm-bb.de</url>
                        </address>
                    </supplier>
                    <licensing licensingCat="de.lverma-bb">
                        <rightsOfUse>
```

Die Institution ISST gew□t der Partnerfirma eine unbefristete, nicht ausschliessliche, eingeschr□te Nutzung.
Hierzu r□t das ISST einer Partnerfirma das Recht ein, die Demodaten in Datenbanken zu speichern, zu bearbeiten, zu kopieren und ausschliesslich im Internet zu nutzen.
Die Demodaten sind ausschliesslich zu eigenen Nutzung bestimmt. Der Erwerb oder Dienstleistung f□tte ist ausgeschlossen.
Die Nutzungsrechte beziehen sich ausschliesslich auf die Nutzing der o.g. Daten.

```
                        </rightsOfUse>
                        <copyright>
```

Das ISST versichert, dass an den von ISST zur Verf□gestellten Daten keine Rechte Dritter im Sinner eines Datenbankurheberrechtsschutzes gem. § 87 a ff. UrhG bestehen. Das ISSt stellt der Partnerfirma insoweit von Anspr□Dritter frei.
Sollte ein ordentliches Gericht oder ein gerichtlicher oder aussergerichtlicher Vergleich zu einer anderen Auffassung kommen, haftet das ISST nicht.

```
                        </copyright>
                        <devolution>
```

Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu □agen, sofern dies nicht ausdr□h genhemigt ist.
F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.

```
                        </devolution>
                        <duties>
```

Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft einzurichten und aufrecht zu halten.
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- Link auf die Homepage vom ISST : www.isst.fhg.de
- Schutz der Daten gegen Auslesen / Downloaden

```
        Eine Weitergabe an Kunden zwecks Internetnutzung bedarf der vorherigen individuellen Vereinbarung mit dem ISST.
    </duties>
                        <warranty>
        Das ISST garantiert nicht, dass die Datenprodukte den Bed□sen oder Erwartungen des Endnutzers entsprechen
werden. Da die Datenprodukte
        u.a. auch aus □ntlichen Verzeichnissen und Registern zusammengestllt werden, kann das ISST trotz st□iger
Vergleichskontrollen die
        Richtigkeit und Vollst□igkeit nicht gew□leisten.
    </warranty>
                        <generalProvisions>
        Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein, so wird dadurch die
G□eit der □n
        Bestimmungen nicht ber□Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine
solche zu ersetzten,
        die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.
        M□he Nebenabreden haben die Parteien nicht getroffen. S□liche □erungen und Erg□ungen dieser Vereinbarung
bef□der Schriftform.
        Auf alle Rechtsbeziehungen zu uns findet ausschliesslich deutsches Recht Anwendung.
    </generalProvisions>
                        <jurisdiction>
        Ist der Kunde Vollkaufmann, so wird f□e Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand
vereinbart.
    </jurisdiction>
                    </licensing>
                </contractInformation>
                <calculation>
                    <declarationList>
                        <referencedParameters>
                            <parameter name="singlePrice" type="real">
                                <variableDescr lang="de">Preis</variableDescr>
                                <variableOrigin originName="price">
                                    <originId>*</originId>
                                </variableOrigin>
                                <variableValue>2</variableValue>
                                <variableUnit textstyle="Euro">
                                    <math>
                                        <apply>
                                            <ci>Euro</ci>
                                        </apply>
                                    </math>
                                </variableUnit>
                            </parameter>
                        </referencedParameters>
                        <resultParameters>
                            <parameter name="price" type="real">
                                <variableDescr lang="de"> Preis </variableDescr>
                                <variableValue>2162.77</variableValue>
                                <variableUnit textstyle="Euro">
                                    <math>
                                        <apply>
                                            <ci>Euro</ci>
                                        </apply>
                                    </math>
                                </variableUnit>
                            </parameter>
                        </resultParameters>
                    </declarationList>
                    <formulae>
                        <function name="Gesamtsumme">
                            <outParameterList>
                                <parameterName>singlePrice</parameterName>
                            </outParameterList>
                            <inParameterList>
```

```
                    <parameterName>price</parameterName>
                </inParameterList>
                <operation>
                    <math>
                        <apply>
                            <eq/>
                            <ci>price</ci>
                            <apply>
                                <sum/>
                                <bvar>singlePrice</bvar>
                                <ci>singlePrice</ci>
                                <!--ci>singlePrice</ci-->
                            </apply>
                        </apply>
                    </math>
                </operation>
            </function>
        </formulae>
    </calculation>
    <product id="1513">
        <title>Demodata A</title>
        <abstract>Demodata</abstract>
        <contractInformation>
            <supplier>
                <supplierId>de.lverma-bb</supplierId>
                <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                <address role="supplier">
                    <name>Landesvermessungsamt Brandenburg</name>
                    <name2/>
                    <contact>Kundendienst</contact>
                    <street>Am Vermessungsamt 1</street>
                    <zip>44227</zip>
                    <city>Potsdam</city>
                    <country>Germany</country>
                    <phone>+49 231 97 00 7 00</phone>
                    <fax>+49 231 97 00 798</fax>
                    <email>info@lverm-bb.de</email>
                    <url>http://www.lverm-bb.de</url>
                </address>
            </supplier>
            <licensing licensingCat="de.lverma-bb">
                <rightsOfUse>
```

Die Institution ISST gew□t der Partnerfirma eine unbefristete, nicht ausschliessliche, eingeschr□te Nutzung.
Hierzu r□t das ISST einer Partnerfirma das Recht ein, die Demodaten in Datenbanken zu speichern, zu bearbeiten, zu kopieren und ausschliesslich im Internet zu nutzen.
Die Demodaten sind ausschliesslich zu eigenen Nutzung bestimmt. Der Erwerb oder Dienstleistung f□tte ist ausgeschlossen.
Die Nutzungsrechte beziehen sich ausschliesslich auf die Nutzing der o.g. Daten.

```
                </rightsOfUse>
                <copyright>
```

Das ISST versichert, dass an den von ISST zur Verf□gestellten Daten keine Rechte Dritter im Sinner eines Datenbankurheberrechtsschutzes gem. § 87 a ff. UrhG bestehen. Das ISSt stellt der Partnerfirma insoweit von Anspr□Dritter frei.
Sollte ein ordentliches Gericht oder ein gerichtlicher oder aussergerichtlicher Vergleich zu einer anderen Auffassung kommen, haftet das ISST nicht.

```
                </copyright>
                <devolution>
```

Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu □agen, sofern dies nicht ausdr□h genhemigt ist.
F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.

```
                </devolution>
                <duties>
```

Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft einzurichten und aufrecht zu halten.

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</duties>

<warranty>

Das ISST garantiert nicht, dass die Datenprodukte den Bed□sen oder Erwartungen des Endnutzers entsprechen werden. Da die Datenprodukte

u.a. auch aus □ntlichen Verzeichnissen und Registern zusammengestllt werden, kann das ISST trotz st□iger Vergleichskontrollen die

Richtigkeit und Vollst□igkeit nicht gew□leisten.

</warranty>

<generalProvisions>

Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein, so wird dadurch die G□eit der □n

Bestimmungen nicht ber□Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine solche zu ersetzten,

die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.

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</generalProvisions>

<jurisdiction>

Ist der Kunde Vollkaufmann, so wird f□e Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand vereinbart.

</jurisdiction>

```
                </licensing>
            </contractInformation>
            <calculation>
                <declarationList>
                    <predefinedParameters>
                        <parameter name="pricePerPunkt" type="real">
                            <variableDescr lang="de"> Preis pro Punkt</variableDescr>
                            <variableDescr lang="en"> Price per Point</variableDescr>
                            <variableValue>15.34</variableValue>
                            <variableUnit textstyle="Euro/Punkt">
                                <math>
                                    <apply>
                                        <divide/>
                                        <ci>Euro</ci>
                                        <ci>Punkt</ci>
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                    </predefinedParameters>
                    <configurationParameters>
                        <parameter name="ArtikelID" type="string">
                            <variableDescr lang="de">ArtikelID</variableDescr>
                            <variableDescr lang="en">ArticelID</variableDescr>
                            <variableValue>1513</variableValue>
                            <variableUnit textstyle="">
                                <math>
                                    <apply>
                                        <cn>1</cn>
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                        <parameter name="ArtikelName" type="string">
```

```
                    <variableDescr lang="de">ArtikelName</variableDescr>
                    <variableDescr lang="en">Articelname</variableDescr>
                    <variableValue>test</variableValue>
                    <variableUnit textstyle="">
                        <math>
                            <apply>
                                <cn>1</cn>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
                <parameter name="Punktanzahl" type="integer">
                    <variableGroup>server</variableGroup>
                    <variableDescr lang="de"> Anzahl der Punkte </variableDescr>
                    <variableDescr lang="en">Number of Points</variableDescr>
                    <variableValue>25</variableValue>
                    <variableUnit textstyle="">
                        <math>
                            <apply>
                                <cn>1</cn>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
                <parameter name="Polygon" type="string">
                    <variableGroup>server</variableGroup>
                    <variableDescr lang="de">Polygon</variableDescr>
                    <variableDescr lang="en">Polygon</variableDescr>

    <variableValue>3330850:5763900,3330950:5763900,3330950:5764000,3330850:5764000,3330850:576390</variabl
eValue>
                    <variableUnit textstyle="">
                        <math>
                            <apply>
                                <cn>1</cn>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
                <parameter name="Area" type="real">
                    <variableGroup>server</variableGroup>
                    <variableDescr lang="de">Fl□e</variableDescr>
                    <variableDescr lang="en">Surface</variableDescr>
                    <variableValue>1000</variableValue>
                    <variableUnit textstyle="m²">
                        <math>
                            <apply>
                                <power/>
                                <ci>m</ci>
                                <cn>2</cn>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </configurationParameters>
            <resultParameters>
                <parameter name="price" type="real">
                    <variableDescr lang="de"> Preis </variableDescr>
                    <variableDescr lang="en">Price</variableDescr>
                    <variableValue>629.02</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
```

```
                                    <ci>Euro</ci>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>
                </resultParameters>
            </declarationList>
            <formulae>
                <function name="Hauptformel19">
                    <outParameterList>
                        <parameterName>Punktanzahl</parameterName>
                        <parameterName>pricePerPunkt</parameterName>
                    </outParameterList>
                    <inParameterList>
                        <parameterName>price</parameterName>
                    </inParameterList>
                    <operation>
                        <math>
                            <apply>
                                <eq/>
                                <ci> price </ci>
                                <piecewise>
                                    <piece>
                                        <apply>
                                            <times/>
                                            <cn>15.34</cn>
                                            <ci>Punktanzahl</ci>
                                        </apply>
                                        <apply>
                                            <lt/>
                                            <ci>Punktanzahl</ci>
                                            <cn>2</cn>
                                        </apply>
                                    </piece>
                                    <otherwise>
                                        <apply>
                                            <plus/>
                                            <apply>
                                                <times/>
                                                <cn>15.34</cn>
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                                            </apply>
                                            <apply>
                                                <times/>
                                                <cn>10.23</cn>
                                                <apply>
                                                    <minus/>
                                                    <ci>Punktanzahl</ci>
                                                    <cn>1</cn>
                                                </apply>
                                            </apply>
                                        </apply>
                                    </otherwise>
                                </piecewise>
                            </apply>
                        </math>
                    </operation>
                </function>
            </formulae>
        </calculation>
    </product>
    <product id="1012">
        <title>Demodata B</title>
```

```
<abstract>Demodata</abstract>
<contractInformation>
    <supplier>
        <supplierId>de.lverma-bb</supplierId>
        <supplierName>Landesvermessungsamt Brandenburg</supplierName>
        <address role="supplier">
            <name>Landesvermessungsamt Brandenburg</name>
            <name2/>
            <contact>Kundendienst</contact>
            <street>Am Vermessungsamt 1</street>
            <zip>44227</zip>
            <city>Potsdam</city>
            <country>Germany</country>
            <phone>+49 231 97 00 7 00</phone>
            <fax>+49 231 97 00 798</fax>
            <email>info@lverm-bb.de</email>
            <url>http://www.lverm-bb.de</url>
        </address>
    </supplier>
    <licensing licensingCat="de.lverma-bb">
        <rightsOfUse>
```


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```
    </rightsOfUse>
        <copyright>
```


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```
    </copyright>
        <devolution>
```


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F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.


```
    </devolution>
        <duties>
```


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```
    </duties>
        <warranty>
```


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u.a. auch aus □ntlichen Verzeichnissen und Registern zusammengestllt werden, kann das ISST trotz st□iger Vergleichskontrollen die
Richtigkeit und Vollst□igkeit nicht gew□leisten.


```
    </warranty>
        <generalProvisions>
```


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Bestimmungen nicht ber□Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine solche zu ersetzten,
die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.

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```
  </generalProvisions>
                        <jurisdiction>
```

Ist der Kunde Vollkaufmann, so wird f□e Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand vereinbart.

```
  </jurisdiction>
                    </licensing>
                </contractInformation>
                <calculation>
                    <declarationList>
                        <predefinedParameters>
                            <parameter name="kindofproduct" type="string">
                                <variableDescr lang="de">Art des Produkts</variableDescr>
                                <variableDescr lang="en">Kind of Product</variableDescr>
                                <variableValue>analog</variableValue>
                                <variableUnit textstyle="">
                                    <math>
                                        <apply>
                                            <divide/>
                                            <ci>Euro</ci>
                                            <ci>Punkt</ci>
                                        </apply>
                                    </math>
                                </variableUnit>
                            </parameter>
                            <parameter name="pricePerBlatt" type="real">
                                <variableDescr lang="de"> Preis pro Blatt</variableDescr>
                                <variableDescr lang="en"> Price per Page</variableDescr>
                                <variableValue>20.45</variableValue>
                                <variableUnit textstyle="Euro/Punkt">
                                    <math>
                                        <apply>
                                            <divide/>
                                            <ci>Euro</ci>
                                            <ci>Punkt</ci>
                                        </apply>
                                    </math>
                                </variableUnit>
                            </parameter>
                        </predefinedParameters>
                        <configurationParameters>
                            <parameter name="ArtikelID" type="string">
                                <variableDescr lang="de">ArtikelID</variableDescr>
                                <variableDescr lang="en">ArticelID</variableDescr>
                                <variableValue>1012</variableValue>
                                <variableUnit textstyle="">
                                    <math>
                                        <apply>
                                            <cn>1</cn>
                                        </apply>
                                    </math>
                                </variableUnit>
                            </parameter>
                            <parameter name="ArtikelName" type="string">
                                <variableDescr lang="de">ArtikelName</variableDescr>
                                <variableDescr lang="en">Articelname</variableDescr>
                                <variableValue>test</variableValue>
                                <variableUnit textstyle="">
                                    <math>
                                        <apply>
                                            <cn>1</cn>
```

```
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                        <parameter name="Polygon" type="string">
                            <variableGroup>server</variableGroup>
                            <variableDescr lang="de">Polygon</variableDescr>
                            <variableDescr lang="en">Polygon</variableDescr>

    <variableValue>3330850:5763900,3330950:5763900,3330950:5764000,3330850:5764000,3330850:576390</variabl
eValue>
                            <variableUnit textstyle="">
                                <math>
                                    <apply>
                                        <cn>1</cn>
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                        <parameter name="Area" type="real">
                            <variableGroup>server</variableGroup>
                            <variableDescr lang="de">Fl□e</variableDescr>
                            <variableDescr lang="en">Surface</variableDescr>
                            <variableValue>1000</variableValue>
                            <variableUnit textstyle="m²">
                                <math>
                                    <apply>
                                        <power/>
                                        <ci>m</ci>
                                        <cn>2</cn>
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                        <parameter name="Punktanzahl" type="integer">
                            <variableGroup>server</variableGroup>
                            <variableDescr lang="de">Anzahl der Punkte </variableDescr>
                            <variableDescr lang="en">Number of Points </variableDescr>
                            <variableValue>25</variableValue>
                            <variableUnit textstyle="">
                                <math>
                                    <apply>
                                        <cn>1</cn>
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                        <parameter name="Blaetteranzahl" type="integer">
                            <variableGroup>server</variableGroup>
                            <variableDescr lang="de">Anzahl der Blaetter </variableDescr>
                            <variableDescr lang="en">Number of Pages</variableDescr>
                            <variableValue>3</variableValue>
                            <variableUnit textstyle="">
                                <math>
                                    <apply>
                                        <cn>1</cn>
                                    </apply>
                                </math>
                            </variableUnit>
                        </parameter>
                    </configurationParameters>
                    <resultParameters>
                        <parameter name="price" type="real">
```

```
                        <variableDescr lang="de">Preis </variableDescr>
                        <variableDescr lang="en">Price </variableDescr>
                        <variableValue>1533.75</variableValue>
                        <variableUnit textstyle="Euro">
                            <math>
                                <apply>
                                    <ci>Euro</ci>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>
                </resultParameters>
            </declarationList>
            <formulae>
                <function name="Hauptformel20">
                    <outParameterList>
                        <parameterName>Blaetteranzahl</parameterName>
                        <parameterName>pricePerBlatt</parameterName>
                        <parameterName>Punktanzahl</parameterName>
                    </outParameterList>
                    <inParameterList>
                        <parameterName>price</parameterName>
                    </inParameterList>
                    <operation>
                        <math>
                            <apply>
                                <eq/>
                                <ci> price </ci>
                                <apply>
                                    <times/>
                                    <ci>pricePerBlatt</ci>
                                    <ci>Blaetteranzahl</ci>
                                    <ci>Punktanzahl</ci>
                                </apply>
                            </apply>
                        </math>
                    </operation>
                </function>
            </formulae>
        </calculation>
    </product>
</productGroup>
</productGroup>
</xcpfCatalog>
</xcpfEnvelope>
```

4.1.7 HTTP GET OrderProduct Request

```
REQUEST=OrderProduct&PRODUCTID=1513,1012&SERVICEREQUEST=,&CONFIGPARAMS=Art
ikelID%3D1513%26Polygon%3D330850%3A5763900%2C3330950%3A5763900%2C3330950%3
A5764000%2C3330850%3A5764000%2C3330850%3A576390%26Area%3D1000%26ArtikelNam
e%3Dtest%26Punktanzahl%3D25,ArtikelID%3D1012%26Blaetteranzahl%3D3%26Polygo
n%3D3330850%3A5763900%2C3330950%3A5763900%2C3330950%3A5764000%2C3330850%3A
5764000%2C3330850%3A576390%26Area%3D1000%26ArtikelName%3D
test%26Punktanzahl%3D25 SERVICEPROTOCOL=,&DEFNAME1=Wagner&DEFSTREET=Emil-
Figge-Str.91&DEFZIP=44227&DEFCITY=Dortmund&DEFMAIL=w@gner.org
```

4.1.8 OrderProduct Response XCPF

```
<?xml version="1.0" encoding="UTF-8"?>
<xcpfEnvelope id="de.lverma-bbEnvelope">
    <calculation>
        <declarationList>
            <referencedParameters>
                <parameter name="singlePrice" type="real">
                    <variableDescr lang="de">Preis</variableDescr>
                    <variableOrigin originName="price">
                        <originId>*</originId>
                    </variableOrigin>
                    <variableValue>2</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </referencedParameters>
            <resultParameters>
                <parameter name="price" type="real">
                    <variableDescr lang="de"> Preis </variableDescr>
                    <variableValue/>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>
                            </apply>
                        </math>
                    </variableUnit>
                </parameter>
            </resultParameters>
        </declarationList>
        <formulae>
            <function name="Gesamtsumme">
                <outParameterList>
                    <parameterName>singlePrice</parameterName>
                </outParameterList>
                <inParameterList>
                    <parameterName>price</parameterName>
                </inParameterList>
                <operation>
                    <math>
                        <apply>
                            <eq/>
                            <ci>price</ci>
                            <apply>
                                <sum/>
                                <bvar>singlePrice</bvar>
                                <ci>singlePrice</ci>
                                <!--ci>singlePrice</ci-->
                            </apply>
                        </apply>
                    </math>
                </operation>
            </function>
        </formulae>
    </calculation>
    <xcpfCatalog id="1351494981980061781">
        <transactionNumber>1351494981980061781</transactionNumber>
```

```
<inheritance>
    <contractInformation>
        <customer>
            <customerId>1739384622094560325</customerId>
            <customerName/>
            <address role="customer" type="default">
                <name>Roland M. Wagner</name>
                <name2/>
                <contact/>
                <street>Emil-Figge-Strasse 91</street>
                <zip>44227</zip>
                <city>Dortmund</city>
                <country/>
                <phone/>
                <fax/>
                <email>wagner@do.isst.fhg.de</email>
                <url/>
            </address>
        </customer>
    </contractInformation>
</inheritance>
<calculation>
    <declarationList>
        <referencedParameters>
            <parameter name="singlePrice" type="real">
                <                lang="de">Preis</                >
                <variableOrigin originName="price">
                    <originId>*</originId>
                </variableOrigin>
                <                >2</                >
                <variableUnit textstyle="Euro">
                    <math>
                        <apply>
                            <ci>Euro</ci>
                        </apply>
                    </math>
                </variableUnit>
            </            >
        </referencedParameters>
        <resultParameters>
            <parameter name="price" type="real">
                <variableDescr lang="de"> Preis </variableDescr>
                <variableValue/>
                <variableUnit textstyle="Euro">
                    <math>
                        <apply>
                            <ci>Euro</ci>
                        </apply>
                    </math>
                </variableUnit>
            </parameter>
        </resultParameters>
    </declarationList>
    <          >
        <function name="Gesamtsumme">
            <outParameterList>
                <parameterName>singlePrice</parameterName>
            </                >
            <                >
                <                >price</                >
            </                >
            <          >
                <math>
```

```
                        <apply>
                            <eq/>
                            <ci>price</ci>

                                <sum/>
                                <bvar>singlePrice</bvar>

                                <!--ci>singlePrice</ci-->
                            </apply>
                        </apply>
                    </math>
                </operation>
            </function>
        </formulae>
    </calculation>
    <productGroup id="LVermA Brandenburg" name="">
        <generatorInfo>Roland Wagner</generatorInfo>
        <xcpfVer>0.3.0</xcpfVer>

Brandenburg)</title>
        <abstract/>
        <calculation>

            <referencedParameters>
                <parameter name="singlePrice" type="real">
                    <variableDescr lang="de">Preis</variableDescr>
                    <variableOrigin originName="price">
                        <originId>*</originId>
                    </variableOrigin>
                    <variableValue>2</variableValue>
                    <variableUnit textstyle="Euro">
                        <math>
                            <apply>
                                <ci>Euro</ci>

                            </math>
                        </variableUnit>
                    </parameter>
                </referencedParameters>
                <resultParameters>
                    <parameter name="price" type="real">
                        <variableDescr lang="de"> Preis </variableDescr>
                        <variableValue/>
                        <variableUnit textstyle="Euro">
                            <math>
                                <apply>
                                    <ci>Euro</ci>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>

            </declarationList>
            <formulae>
                <function name="Gesamtsumme">
                    <outParameterList>
                        <parameterName>singlePrice</parameterName>
                    </outParameterList>
                    <inParameterList>
                        <parameterName>price</parameterName>
                    </inParameterList>
                    <operation>
                        <math>
```

```
                                <apply>
                                    <eq/>
                                    <ci>price</ci>

                                        <sum/>
                                        <bvar>singlePrice</bvar>
                                        <ci>singlePrice</ci>
                                        <!--ci>singlePrice</ci-->
                                    </apply>
                                </        >
                            </math>
                        </operation>
                    </function>
                </formulae>
            </calculation>

                <contractInformation>
                    <           >

                        <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                        <address role="supplier">
                            <        >Landesvermessungsamt Brandenburg</         >

                            <contact>Kundendienst</contact>
                            <street>Am Vermessungsamt 1</street>
                            <     >44227</     >
                            <city>Potsdam</city>
                            <country>Germany</country>
                            <phone>+49 231 97 00 7 00</phone>
                            <     >+49 231 97 00 798</     >

                            <url>http://www.lverm-bb.de</url>
                        </address>
                    </supplier>
                    <               licensingCat="de.lverma-bb">
                        <rightsOfUse>
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    </rightsOfUse>
                        <copyright>
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kommen, haftet das ISST nicht.
    </copyright>
                        <devolution>

dies nicht ausdr□h genhemigt ist.
        F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM
50.000,- zu zahlen.
    </devolution>
                        <        >
        Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft einzurichten und
aufrecht zu halten.
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```

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<warranty>
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Richtigkeit und Vollst□igkeit nicht gew□leisten.
</warranty>
<generalProvisions>
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solche zu ersetzten,
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<jurisdiction>
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</jurisdiction>
</licensing>

<calculation>
<declarationList>
<referencedParameters>
<parameter name="singlePrice" type="real">
<variableDescr lang="de">Preis</variableDescr>
<variableOrigin originName="price">
<originId>*</originId>
</variableOrigin>
<variableValue>2</variableValue>

<math>
<apply>
<ci>Euro</ci>
</apply>
</math>
</variableUnit>
</parameter>
</referencedParameters>
<resultParameters>
<parameter name="price" type="real">
<variableDescr lang="de"> Preis </variableDescr>
< />

<math>
<apply>
<ci>Euro</ci>
</apply>
</math>
</variableUnit>
</ >

</declarationList>
<formulae>
<function name="Gesamtsumme">
<outParameterList>
<parameterName>singlePrice</parameterName>
</ >

```
                    <parameterName>price</parameterName>
                </inParameterList>
                <operation>
                    <math>
                        <apply>
                            <eq/>
                            <ci>price</ci>
                            <apply>
                                <sum/>
                                <bvar>singlePrice</bvar>
                                <ci>singlePrice</ci>
                                <!--ci>singlePrice</ci-->
                            </apply>
                        </apply>
                    </       >
                </operation>
            </function>
        </formulae>
    </             >

        <title>Demodata B</title>
        <abstract>Demodata</abstract>

            <supplier>
                <supplierId>de.lverma-bb</supplierId>
                <supplierName>Landesvermessungsamt Brandenburg</supplierName>
                <address role="supplier">
                    <name>Landesvermessungsamt Brandenburg</name>
                    <name2/>
                    <contact>Kundendienst</contact>
                    <street>Am Vermessungsamt 1</street>
                    <zip>44227</zip>
                    <city>Potsdam</city>
                    <country>Germany</country>
                    <phone>+49 231 97 00 7 00</phone>
                    <    >+49 231 97 00 798</    >
                    <email>info@lverm-bb.de</email>

                </address>
            </supplier>
            <licensing licensingCat="de.lverma-bb">
                <rightsOfUse>
```

Die Institution ISST gew□t der Partnerfirma eine unbefristete, nicht ausschliessliche, eingeschr□te Nutzung.
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```
    </rightsOfUse>
                <           >
```

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```
                <devolution>
```

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F□ Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.

```
    </devolution>
                <duties>
```

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<warranty>
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Vergleichskontrollen die
Richtigkeit und Vollst□igkeit nicht gew□leisten.
</warranty>
<generalProvisions>
Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein, so wird dadurch die G□eit der □n

solche zu ersetzten,
die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird.
M□he Nebenabreden haben die Parteien nicht getroffen. S□liche □erungen und Erg□ungen dieser Vereinbarung bef□der Schriftform.
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</generalProvisions>
<jurisdiction>
Ist der Kunde Vollkaufmann, so wird f□e Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand vereinbart.
</jurisdiction>
</licensing>
</contractInformation>
<calculation>
<declarationList>
<predefinedParameters>
<parameter name="kindofproduct" type="string">
<="de">Art des Produkts</>

<variableValue>analog</variableValue>
<variableUnit textstyle="">
<>

<divide/>
<ci>Euro</ci>
<ci>Punkt</ci>
</apply>
</>

</parameter>
<parameter name="pricePerBlatt" type="real">
<variableDescr lang="de"> Preis pro Blatt</variableDescr>
<variableDescr lang="en"> Price per Page</variableDescr>
<variableValue>20.45</variableValue>

<math>
<>

<ci>Euro</ci>
<ci>Punkt</ci>
</apply>
</>
</>
</parameter>
</predefinedParameters>

```
<configurationParameters>
    <parameter name="ArtikelID" type="string">
        <variableDescr lang="de">ArtikelID</variableDescr>
        <variableDescr lang="en">ArticelID</variableDescr>

        <variableUnit textstyle="">
            <math>

                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="ArtikelName" type="string">
        <variableDescr lang="de">ArtikelName</variableDescr>
        <variableDescr lang="en">Articelname</variableDescr>
        <variableValue>test</variableValue>
        <variableUnit textstyle="">
            <math>
                <apply>
                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="Polygon" type="string">
        <variableGroup>server</variableGroup>
        <variableDescr lang="de">Polygon</variableDescr>


    <variableValue>3330850:5763900,3330950:5763900,3330950:5764000,3330850:5764000,3330850:576390</variabl
eValue>
        <variableUnit textstyle="">
            <math>
                <apply>
                    <cn>1</cn>
                </apply>
            </math>
        </variableUnit>
    </parameter>
    <parameter name="Area" type="real">
        <                    >server</                    >
        <variableDescr lang="de">Fl□e</variableDescr>
        <variableDescr lang="en">Surface</variableDescr>
        <variableValue>1000</variableValue>
        <variableUnit textstyle="m²">
            <math>

                    <power/>
                    <ci>m</ci>
                    <cn>2</cn>
                </apply>

        </variableUnit>
    </parameter>
    <parameter name="Punktanzahl" type="integer">
        <variableGroup>server</variableGroup>
        <variableDescr lang="de">Anzahl der Punkte </variableDescr>
        <variableDescr lang="en">Number of Points </variableDescr>
        <variableValue>25</variableValue>
        <variableUnit textstyle="">
            <math>
                <apply>
```

```
                                <cn>1</cn>
                            </apply>
                        </math>
                    </variableUnit>

                    <parameter name="Blaetteranzahl" type="integer">
                        <variableGroup>server</variableGroup>
                        <variableDescr lang="de">Anzahl der Blaetter </variableDescr>
                        <variableDescr lang="en">Number of Pages</variableDescr>
                        <                >3</                >
                        <variableUnit textstyle="">
                            <math>
                                <apply>
                                    <cn>1</cn>
                                </apply>
                            </math>

                    </parameter>
                </configurationParameters>
                <resultParameters>
                    <parameter name="price" type="real">
                        <variableDescr lang="de">Preis </variableDescr>
                        <variableDescr lang="en">Price </variableDescr>
                        <variableValue/>
                        <variableUnit textstyle="Euro">
                            <math>
                                <apply>
                                    <ci>Euro</ci>
                                </apply>
                            </math>
                        </variableUnit>
                    </parameter>
                </resultParameters>
            </declarationList>
            <formulae>
                <function name="Hauptformel20">
                    <outParameterList>

                        <parameterName>pricePerBlatt</parameterName>
                        <parameterName>Punktanzahl</parameterName>
                    </outParameterList>
                    <inParameterList>
                        <                >price</                >

                    <           >

                            <apply>
                                <eq/>
                                <ci> price </ci>
                                <apply>
                                    <times/>
                                    <  >pricePerBlatt</  >

                                    <ci>Punktanzahl</ci>
                                </apply>
                            </apply>
                        </math>
                    </operation>
                </function>
            </formulae>
        </calculation>
    </product>
</productGroup>
```

```
            </productGroup>
        </xcpfCatalog>
    </xcpfEnvelope>
```

4.2 WPOS with OGC WMS Service Request

4.2.1 HTTP GET GetPrice Request

```
http://azreal:8761/wpos/servlet/wpos.Controller?Request=getPrice&productId
=1005,http%3A%2F%2Fxtra.interactive-instruments.de%2Fcgi-
bin%2FXtraWMS&serviceRequest=,VERSION%3D1.1.0%26REQUEST%3DGetMap%26LAYERS%
3DStrassen%26STYLES%3DStandard%26SRS%3DEPSG%3A31466%26FORMAT%3Dimage%2Fpng
%26BGCOLOR%3D0xFFFFFF%26TRANSPARENT%3DFALSE%26WIDTH%3D514%26HEIGHT%3D426%2
6BBOX%3D2465148.7644131454%2C5576452%2C2764016.1155868545%2C5824151.4%26EX
CEPTIONS%3Dapplication%2Fvnd.ogc.se_xml&serviceProtocol=,Organisation%3DOG
C%26Name%3DWMS%26Version%3D1.0&Config=Area%3D1000%26xmax%3D3%26ymax%3D4%26
Polygon%3D3330850%3A5763900%2C3330950%3A5763900%2C3330950%3A5764000%2C3330
850%3A5764000%2C3330850%3A576390%26xmin%3D1%26ymin%3D2%26height%3D5%26widt
h%3D6,
```

4.2.2 XCPF Response Object

```
<?xml version="1.0" encoding="ISO-8859-1"?>

<xcpfEnvelope id="tms">
  <calculation>
    <declarationList>
      <referencedParameters>
        <parameter name="singlePrice" type="real">
          <variableDescr lang="de">Preis</variableDescr>
          <variableOrigin originName="price">
            <originId>*</originId>
          </variableOrigin>
          <variableValue>2</variableValue>
          <variableUnit textstyle="Euro">
            <math>
              <apply>
                <ci>Euro</ci>
              </apply>
            </math>

        </parameter>
      </referencedParameters>
      <resultParameters>
        <parameter name="price" type="real">
          <variableDescr lang="de">Preis</variableDescr>
          <variableValue>986300.00</variableValue>
          <variableUnit textstyle="Euro">
            <math>
              <apply>
                <ci>Euro</ci>
              </apply>
            </math>

        </parameter>
      </resultParameters>
    </declarationList>
    <formulae>
      <function name="Gesamtsumme">
```

```
      <outParameterList>
        <parameterName>singlePrice</parameterName>
      </outParameterList>
      <inParameterList>
        <parameterName>price</parameterName>
      </inParameterList>
      <operation>

        <apply>
          <eq/>
          <ci>price</ci>
          <apply>
            <sum/>
            <       >singlePrice</       >
            <ci>singlePrice</ci>


          </apply>
        </apply>
      </       >
      </operation>
    </function>
  </formulae>
</calculation>
<xcpfCatalog id="tms">
  <calculation>
    <declarationList>
      <                              >

        <variableDescr lang="de">Preis</variableDescr>
        <variableOrigin originName="price">
          <originId>*</originId>
        </                    >

        <variableUnit textstyle="Euro">
          <math>
            <apply>
              <ci>Euro</ci>
            </apply>
          </math>
        </variableUnit>
      </parameter>
    </referencedParameters>
    <resultParameters>
      <parameter name="price" type="real">
        <variableDescr lang="de">Preis</variableDescr>
        <variableValue>986300.00</variableValue>
        <variableUnit textstyle="Euro">
          <math>
            <apply>


            </apply>
          </math>
        </variableUnit>
      </parameter>
    </resultParameters>
  </declarationList>
  <formulae>
    <function name="Gesamtsumme">
      <outParameterList>
        <parameterName>singlePrice</parameterName>
      </outParameterList>
      <                     >
```

```
        <parameterName>price</parameterName>
      </inParameterList>
      <operation>
        <math>
          <apply>
            <eq/>
            <  >price</  >
            <       >

              <bvar>singlePrice</bvar>
              <ci>singlePrice</ci>
              <!--ci>singlePrice</ci-->

            </apply>
          </       >
        </math>
      </operation>
    </function>
  </formulae>
</calculation>
<productGroup id="gdms" name="">

  <xcpfVer>0.4.3</xcpfVer>
  <title>Leistungs- und Entgeltverzeichnis von LGB (Landesvermessung und Geobasisinformation Brandenburg)</title>
  <abstract/>
  <inheritance>
    <contractInformation>
      <supplier>

        <supplierName>Landesvermessungsamt Brandenburg</supplierName>
        <address role="supplier">
          <name>Landesvermessungsamt Brandenburg</name>
          <name2/>
          <contact>Kundendienst</contact>
          <       >Am Vermessungsamt 1</       >
          <zip>44227</zip>
          <city>Potsdam</city>
          <country>Germany</country>
          <phone>+49 231 97 00 7 00</phone>
          <fax>+49 231 97 00 798</fax>
          <email>info@lverm-bb.de</email>
          <url>http://www.lverm-bb.de</url>

      </supplier>
      <licensing licensingCat="de.lverma-bb">
        <rightsOfUse>Die Institution ISST gewährt der Partnerfirma eine unbefristete, nicht ausschliessliche,
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        <copyright>Das ISST versichert, dass an den von ISST zur Verfügung gestellten Daten keine Rechte Dritter im
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        <devolution>Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu
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Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.</devolution>
        <duties>Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft
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bedarf der vorherigen individuellen Vereinbarung mit dem ISST.</duties>
```

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<jurisdiction>Ist der Kunde Vollkaufmann, so wird für alle Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als Gerichtsstand vereinbart.</ >

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        <zip>44227</zip>
        <city>Potsdam</city>
        <country>Germany</country>
        <phone>+49 231 97 00 7 00</phone>
        <fax>+49 231 97 00 798</fax>
        <email>info@lverm-bb.de</email>
        <url>http://www.lverm-bb.de</url>
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    <licensing licensingCat="de.lverma-bb">
      <rightsOfUse>Die Institution ISST gewährt der Partnerfirma eine unbefristete, nicht ausschliessliche, eingeschränkte Nutzung. Hierzu räumt das ISST einer Partnerfirma das Recht ein, die Demodaten in Datenbanken zu speichern, zu bearbeiten, zu kopieren und ausschliesslich im Internet zu nutzen. Die Demodaten sind ausschliesslich zu eigenen Nutzung bestimmt. Der Erwerb oder Dienstleistung für Dritte ist ausgeschlossen. Die Nutzungsrechte beziehen sich ausschliesslich auf die Nutzing der o.g. Daten.</rightsOfUse>
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      <devolution>Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu übertragen, sofern dies nicht ausdrücklich genhemigt ist. Für den Fall der Zuwiderhandlung gegen das vorstehende Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.</devolution>
      <duties>Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft einzurichten und aufrecht zu halten. Die Nutzung der Daten im Internet gestattet ISST der Parnerfirma unter folgenden Voraussetzungen : - Quellenangabe : © ? ? Jahr ? ? ISST, Berlin/Dortmund - Link auf die Homepage vom ISST : www.isst.fhg.de - Schutz der Daten gegen Auslesen / Downloaden Eine Weitergabe an Kunden zwecks Internetnutzung bedarf der vorherigen individuellen Vereinbarung mit dem ISST.</duties>
      <warranty>Das ISST garantiert nicht, dass die Datenprodukte den Bedürfnissen oder Erwartungen des Endnutzers entsprechen werden. Da die Datenprodukte u.a. auch aus öffentlichen Verzeichnissen und Registern zusammengestllt werden, kann das ISST trotz ständiger Vergleichskontrollen die Richtigkeit und Vollständigkeit nicht gewährleisten.</warranty>
      <generalProvisions>Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein, so wird dadurch die Gültigkeit der übrigen Bestimmungen nicht berührt. Die Parteien sind in diesem Falle verpflichtet, die unwirksame Bestimmung durch eine solche zu ersetzten, die den beiderseitigen Interessen und dem wirtschaftlichen Zweck weitestgehend gerecht wird. Mündliche Nebenabreden haben die Parteien nicht getroffen. Sämtliche änderungen und Ergänzungen dieser Vereinbarung befürfen der Schriftform. Auf alle Rechtsbeziehungen zu uns findet ausschliesslich deutsches Recht Anwendung.</generalProvisions>
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            <country>Germany</country>
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        <rightsOfUse>Die Institution ISST gewährt der Partnerfirma eine unbefristete, nicht ausschliessliche,
eingeschränkte Nutzung. Hierzu räumt das ISST einer Partnerfirma das Recht ein, die Demodaten in Datenbanken zu
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sich ausschliesslich auf die Nutzing der o.g. Daten.</rightsOfUse>
        <copyright>Das ISST versichert, dass an den von ISST zur Verfügung gestellten Daten keine Rechte Dritter im
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einer anderen Auffassung kommen, haftet das ISST nicht.</copyright>
        <devolution>Die Partnerfirma ist nicht berechtigt, Aufgaben und Pflichten aus dieser Vereinbarung auf Dritte zu
übertragen, sofern dies nicht ausdrücklich genhemigt ist. Für den Fall der Zuwiderhandlung gegen das vorstehende
Verbot hat die Partnerfirma ISST eine Vertragsstrafe von DM 50.000,- zu zahlen.</devolution>
        <duties>Die Parnerfirma verpflichtet sich, auf ihrer Homepage inen Link zur Homepage vom ISST dauerhaft
einzurichten und aufrecht zu halten. Die Nutzung der Daten im Internet gestattet ISST der Parnerfirma unter folgenden
Voraussetzungen : - Quellenangabe : © ? ? Jahr ? ? ISST, Berlin/Dortmund - Link auf die Homepage vom ISST :
www.isst.fhg.de - Schutz der Daten gegen Auslesen / Downloaden Eine Weitergabe an Kunden zwecks Internetnutzung
bedarf der vorherigen individuellen Vereinbarung mit dem ISST.</duties>
        <warranty>Das ISST garantiert nicht, dass die Datenprodukte den Bedürfnissen oder Erwartungen des Endnutzers
entsprechen werden. Da die Datenprodukte u.a. auch aus öffentlichen Verzeichnissen und Registern zusammengestllt
werden, kann das ISST trotz ständiger Vergleichskontrollen die Richtigkeit und Vollständigkeit nicht
gewährleisten.</warranty>
        <generalProvisions>Sollte eine der vorstehenden Bestimmungen aus irgendeinem Rechtsgrund unwirksam sein,
so wird dadurch die Gültigkeit der übrigen Bestimmungen nicht berührt. Die Parteien sind in diesem Falle verpflichtet, die
unwirksame Bestimmung durch eine solche zu ersetzten, die den beiderseitigen Interessen und dem wirtschaftlichen
Zweck weitestgehend gerecht wird. Mündliche Nebenabreden haben die Parteien nicht getroffen. Sämtliche änderungen
und Ergänzungen dieser Vereinbarung befürfen der Schriftform. Auf alle Rechtsbeziehungen zu uns findet ausschliesslich
deutsches Recht Anwendung.</generalProvisions>
        <jurisdiction>Ist der Kunde Vollkaufmann, so wird für alle Rechtsstreitigkeiten aus dieser Vereinbarung Berlin als
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te"></OnlineResource>
            </Get>
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        </DCPType>
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5 XCPF Schema

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<!-- edited with XML Spy v4.1 U (http://www.xmlspy.com) by Hr. Wagner (Fraunhofer Institut Software u. Systemtechnik) --
>
<!--W3C Schema generated by XML Spy v4.1 U (http://www.xmlspy.com)-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:xlink="http://www.w3.org/1999/xlink"
elementFormDefault="qualified">
    <!--======================Main structur====================-->
    <xs:import namespace="http://www.w3.org/1999/xlink" schemaLocation="xlink.xsd"/>
    <xs:element name="xcpfEnvelope">
        <xs:annotation>
            <xs:documentation>Envelope for multiple catalogs, e.g. cascading</xs:documentation>
        </xs:annotation>
        <xs:complexType>
            <xs:sequence>
                <xs:element ref="calculation"/>
                <xs:element name="xcpfCatalog" maxOccurs="unbounded">
                    <xs:annotation>
                        <xs:documentation>Each supplier may have an own pricing catalog, wherein most standard
entries may be inherited, e.g. contact address or licensing information</xs:documentation>
                    </xs:annotation>
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element ref="productStatusList" minOccurs="0"/>
                            <xs:element name="generatorInfo" type="xs:string" minOccurs="0">
                                <xs:annotation>
                                    <xs:documentation>The editor or other information may be written down in this
textfield</xs:documentation>
                                </xs:annotation>
                            </xs:element>
                            <xs:element name="xcpfVer" type="xs:string" minOccurs="0">
                                <xs:annotation>
                                    <xs:documentation>Contains the used version of the XML complex Configuration
&amp;amp; Pricing Format</xs:documentation>
                                </xs:annotation>
                            </xs:element>
                            <xs:element ref="transactionNumber" minOccurs="0"/>
                            <xs:element ref="inheritance" minOccurs="0"/>
                            <xs:element ref="calculation"/>
                            <xs:element ref="productGroup" maxOccurs="unbounded"/>
                        </xs:sequence>
                        <xs:attribute name="id" type="xs:string" use="required"/>
                        <xs:attribute name="name" type="xs:string"/>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
            <xs:attribute name="id" type="xs:string" use="required"/>
            <xs:attribute name="name" type="xs:string"/>
        </xs:complexType>
    </xs:element>
    <xs:complexType name="productGroupType">
        <xs:sequence>
            <xs:element ref="productStatusList" minOccurs="0"/>
            <xs:element ref="title" minOccurs="0"/>
            <xs:element ref="abstract" minOccurs="0"/>
            <xs:element ref="transactionNumber" minOccurs="0"/>
            <xs:element ref="offerDuration" minOccurs="0"/>
            <xs:element ref="inheritance" minOccurs="0"/>
            <xs:element ref="calculation"/>
```

```
            <xs:element name="product" type="productType" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation>Important structure of the smallest unit, which has a complete calculation
environment.
The product block corresponds directly to data product and to its metadata</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element ref="productGroup" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="id" type="xs:string" use="required"/>
        <xs:attribute name="name" type="xs:string"/>
    </xs:complexType>
    <xs:complexType name="productType">
        <xs:sequence>
            <xs:element ref="productStatusList" minOccurs="0"/>
            <xs:element ref="title"/>
            <xs:element ref="abstract" minOccurs="0"/>
            <xs:element ref="transactionNumber" minOccurs="0"/>
            <xs:element ref="offerDuration" minOccurs="0"/>
            <xs:element ref="contractInformation" minOccurs="0"/>
            <xs:element ref="calculation"/>
        </xs:sequence>
        <xs:attribute name="id" type="xs:string" use="required"/>
        <xs:attribute name="name" type="xs:string"/>
    </xs:complexType>
    <!--====================Contract information====================-->
    <xs:complexType name="addressType">
        <xs:sequence>
            <xs:element name="name" type="xs:string">
                <xs:annotation>
                    <xs:documentation>Name of person or institution.</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="name2" type="xs:string" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>Space for additional names.</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="contact" type="xs:string" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>This field may be use for personal names in institutions.</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="street" type="xs:string"/>
            <xs:element name="zip" type="xs:string"/>
            <xs:element name="city" type="xs:string"/>
            <xs:element name="country" type="xs:string"/>
            <xs:element name="phone" type="xs:string" minOccurs="0"/>
            <xs:element name="fax" type="xs:string" minOccurs="0"/>
            <xs:element name="email" type="xs:string" minOccurs="0"/>
            <xs:element name="url" type="xs:string" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="role" use="required">
            <xs:simpleType>
                <xs:restriction base="xs:NMTOKEN">
                    <xs:enumeration value="customer"/>
                    <xs:enumeration value="supplier"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
        <xs:attribute name="type">
            <xs:simpleType>
                <xs:restriction base="xs:NMTOKEN">
```

```
                    <xs:enumeration value="billing"/>
                    <xs:enumeration value="default"/>
                    <xs:enumeration value="delivery"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:attribute>
    </xs:complexType>
    <xs:complexType name="contractInformationType">
        <xs:sequence>
            <xs:element name="supplier">
                <xs:annotation>
                    <xs:documentation>The party who is offering data products must be public.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="supplierId" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>This ID may help to process orders and can help in a distributed
environment an in the case of different spelling of names and addresses.</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="supplierName" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>Short name of the data supplier.</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element ref="address"/>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
            <xs:element name="customer" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>In opposite to the supplier, the customer may be anonymous until he orders with
the WPOS method "orderproduct".</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="customerId" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>Even customer must have an account ID. This is necessary to link the
stack of orders to a customer.</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element name="customerName" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>Short name of customer.</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                        <xs:element ref="address" maxOccurs="unbounded"/>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
            <xs:element name="licensing">
                <xs:annotation>
                    <xs:documentation>Each licensing entry must have an ID. In future, this ID may stand for a special
group of licensing, which may be processed automatically.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="rightsOfUse" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>Licensing term</xs:documentation>
                            </xs:annotation>
```

```
                        </xs:element>
                        <xs:element name="copyright" type="xs:string"/>
                        <xs:element name="devolution" type="xs:string"/>
                        <xs:element name="duties" type="xs:string"/>
                        <xs:element name="warranty" type="xs:string"/>
                        <xs:element name="generalProvisions" type="xs:string"/>
                        <xs:element name="jurisdiction" type="xs:string"/>
                    </xs:sequence>
                    <xs:attribute name="licensingCat" type="xs:string" use="required"/>
                </xs:complexType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
    <!--====================Calculation elements=====================-->
    <xs:complexType name="calculationType">
        <xs:sequence>
            <xs:element name="declarationList">
                <xs:annotation>
                    <xs:documentation>Parameter need to be declared prior processing.  The input and output workflows
can be determined by using categories.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="predefinedParameters" minOccurs="0">
                            <xs:annotation>
                                <xs:documentation>Some parameters are necessary for the processing, but are constant,
e.g. tax. These parameter can be declared as "predefined".</xs:documentation>
                            </xs:annotation>
                            <xs:complexType>
                                <xs:sequence>
                                    <xs:element ref="parameter" minOccurs="0" maxOccurs="unbounded"/>
                                </xs:sequence>
                            </xs:complexType>
                        </xs:element>
                        <xs:element name="configurationParameters" minOccurs="0">
                            <xs:annotation>
                                <xs:documentation>Other parameter values need to be set by user. All these parameters
will be visualized. Some of these may be used for pricing, e.g. Contract time, other may be used for data generation, e.g.
style=red and some for both, e.g. data format= dxf.</xs:documentation>
                            </xs:annotation>
                            <xs:complexType>
                                <xs:sequence>
                                    <xs:element ref="parameter" minOccurs="0" maxOccurs="unbounded"/>
                                </xs:sequence>
                            </xs:complexType>
                        </xs:element>
                        <xs:element name="referencedParameters" minOccurs="0">
                            <xs:annotation>
                                <xs:documentation>NOTE: Only used in productGroup!

This parameter group is needed for hierarchical calculations, where parameter values of previous calculated values can
be accessed.

An often used example is the sum, where in previous prices are summarized.</xs:documentation>
                            </xs:annotation>
                            <xs:complexType>
                                <xs:sequence>
                                    <xs:element ref="parameter" minOccurs="0" maxOccurs="unbounded"/>
                                </xs:sequence>
                            </xs:complexType>
                        </xs:element>
                        <xs:element name="precalculatedParameters" minOccurs="0">
                            <xs:annotation>
```

```
                        <xs:documentation>This kind of parameter are being used as sub functions. These
functions may be mathematical operations or XCPF Web Service Calls (XCPF-WSC) and have only values at runtime.
The XCPF-WSC are useful for access to mass storage, for complex calculations or for actual data.
They are results of functions.

An often used example is the calculation of a surface of a polygon.</xs:documentation>
                    </xs:annotation>
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element ref="parameter" minOccurs="0" maxOccurs="unbounded"/>
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
                <xs:element name="resultParameters">
                    <xs:annotation>
                        <xs:documentation>This textfield contains the parameter for the final result of all
calculations.

An example is: price</xs:documentation>
                    </xs:annotation>
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element ref="parameter" minOccurs="0"/>
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
    <xs:element name="formulae">
        <xs:annotation>
            <xs:documentation>All declared parameters may be processed by formulae in this
block</xs:documentation>
        </xs:annotation>
        <xs:complexType>
            <xs:sequence>
                <xs:element name="function" maxOccurs="unbounded">
                    <xs:annotation>
                        <xs:documentation>The calculations may use several sub function or XPCF web Service
Calls (XCPF-WSC) and a main function, which result need to be mapped to a parameter declared in the
"resultParameters" block</xs:documentation>
                    </xs:annotation>
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element name="outParameterList">
                                <xs:annotation>
                                    <xs:documentation>This list contains all parameters, which will be used in the
formula or in the Web Service Call</xs:documentation>
                                </xs:annotation>
                                <xs:complexType>
                                    <xs:sequence>
                                        <xs:element ref="parameterName" minOccurs="0"
maxOccurs="unbounded"/>
                                    </xs:sequence>
                                </xs:complexType>
                            </xs:element>
                            <xs:element name="inParameterList">
                                <xs:annotation>
                                    <xs:documentation>This list contains the returned parameters, which are the
results</xs:documentation>
                                </xs:annotation>
                                <xs:complexType>
                                    <xs:sequence>
```

```
                                        <xs:element ref="parameterName" minOccurs="0"
maxOccurs="unbounded"/>
                                    </xs:sequence>
                                </xs:complexType>
                            </xs:element>
                            <xs:element name="operation">
                                <xs:annotation>
                                    <xs:documentation>The operation Block contains a:
-mathematical forumula or a
-XCPF Web Service Call Url</xs:documentation>
                                </xs:annotation>
                                <xs:complexType>
                                    <xs:choice>
                                        <xs:element ref="math"/>
                                        <xs:element name="DCPType">
                                            <xs:annotation>
                                                <xs:documentation>XCPF Web Service Call for external
processing</xs:documentation>
                                            </xs:annotation>
                                            <xs:complexType>
                                                <xs:sequence>
                                                    <xs:element name="HTTP">
                                                        <xs:complexType>
                                                            <xs:sequence>
                                                                <xs:element name="Get">
                                                                    <xs:annotation>
                                                                        <xs:documentation>HTTP Get
Method</xs:documentation>
                                                                    </xs:annotation>
                                                                    <xs:complexType>
                                                                        <xs:sequence>
                                                                            <xs:element
name="OnlineResource">
                                                                                <xs:annotation>

    <xs:documentation>URL, e.g. http://www.geo-ebusiness.de</xs:documentation>
                                                                                </xs:annotation>
                                                                                <xs:complexType>
                                                                                    <xs:attribute
ref="xlink:type" fixed="simple"/>
                                                                                    <xs:attribute
ref="xlink:href" use="required"/>
                                                                                </xs:complexType>
                                                                            </xs:element>
                                                                        </xs:sequence>
                                                                    </xs:complexType>
                                                                </xs:element>
                                                            </xs:sequence>
                                                        </xs:complexType>
                                                    </xs:element>
                                                </xs:sequence>
                                            </xs:complexType>
                                        </xs:element>
                                    </xs:choice>
                                </xs:complexType>
                            </xs:element>
                        </xs:sequence>
                        <xs:attribute name="name" type="xs:string"/>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
```

```
        </xs:sequence>
    </xs:complexType>
    <xs:element name="calculation" type="calculationType">
        <xs:annotation>
            <xs:documentation>Because of rebates, taxes or other pricing mechanisms, pricing models may be adjusted
with a formula on each hierarchical step of the pricing catalog; At least, a simple sum formula must be
calculated</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:complexType name="parameterType">
        <xs:sequence>
            <xs:element name="variableDescr" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation>Each parameter has a logical name. But at least for language reasons several
different descriptions are useful. These descriptions may use white spaces and can contain
sentences.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:simpleContent>
                        <xs:extension base="xs:string">
                            <xs:attribute name="lang" type="xs:string" use="required"/>
                        </xs:extension>
                    </xs:simpleContent>
                </xs:complexType>
            </xs:element>
            <xs:element name="variableGroup" type="xs:string" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation>Typical some parameters may be used for some reasons as groups. The group
relationship will be expressed by equal strings in the variableGroup field.
Parameter may belong to more groups, e.g. for "pricing" and for generation "geoserver".

An example is the use of a set of parameters for data generation. These parameters should contain a string, e.g.
"geoserver". All the parameters with that string may be filtered and transferred to geo data generation
server.</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="variableOrigin" minOccurs="0">
                <xs:annotation>
                    <xs:documentation>NOTE: Variable Origin will only be used in "referencedParameters" blocks. The
required attribute "orginName" contains the original name of a low hierarchical parameter.

Referenced parameter can be used in to ways:
-Multiple Reference with lists of parameter values
-Single Reference

An often used multiple example is the price calculation, which refer to the list of all previous results.</xs:documentation>
                </xs:annotation>
                <xs:complexType>
                    <xs:sequence>
                        <xs:element name="originId" type="xs:string">
                            <xs:annotation>
                                <xs:documentation>Multiple references need a "*" as a wildcard for all parameter values
with the in variable Origin used names, not depending on product entries</xs:documentation>
                            </xs:annotation>
                        </xs:element>
                    </xs:sequence>
                    <xs:attribute name="originName" type="xs:string" use="required"/>
                </xs:complexType>
            </xs:element>
            <xs:element name="variableValue" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation>The need for a value is depending on the parametergroup of the declarationList:
-predefinedParameters must a value, because they are constant
```

```
-configurationParameters may have a value as a default
-referencedParameters do not have a value
-calcuationParameters do not have a value
-resultParameters do not have a value</xs:documentation>
                    </xs:annotation>
                    <xs:complexType>
                        <xs:simpleContent>
                            <xs:extension base="xs:string">
                                <xs:attribute name="condition" type="xs:string"/>
                                <xs:attribute name="selected" type="xs:string"/>
                            </xs:extension>
                        </xs:simpleContent>
                    </xs:complexType>
                </xs:element>
                <xs:element name="variableUnit">
                    <xs:annotation>
                        <xs:documentation>Units are important for a correct calcuation. Therefore they have to be set in an
engine processable way with MathML. But it might be neutral with a "1". They attribute textstyle should be used for string
expressions, which may easly displayed. An example is: km^2</xs:documentation>
                    </xs:annotation>
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element ref="math"/>
                        </xs:sequence>
                        <xs:attribute name="textstyle" type="xs:string" use="required"/>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
            <xs:attribute name="name" type="xs:string" use="required">
                <xs:annotation>
                    <xs:documentation source="Source" xml:lang="en">The name of a parameter has the function to access
the parameter and its values for processing. Therefore it need to "engine readable". That means typically, that it should
only contain ASCII127 letters. Other letters, like ä,ü or ê may be treated on different computer platforms is a different way.
White space are not allowed for naming. Names are case-sensitive.</xs:documentation>
                </xs:annotation>
            </xs:attribute>
            <xs:attribute name="type" use="required">
                <xs:simpleType>
                    <xs:restriction base="xs:NMTOKEN">
                        <xs:enumeration value="boolean"/>
                        <xs:enumeration value="integer"/>
                        <xs:enumeration value="real"/>
                        <xs:enumeration value="string"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:attribute>
        </xs:complexType>
        <xs:element name="parameter" type="parameterType">
            <xs:annotation>
                <xs:documentation>The parameter object is the basic element for the calculation</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="parameterName" type="xs:string">
            <xs:annotation>
                <xs:documentation>All used parameter need to be declared in the declaration List block. Therefore they do
not be completley redeclared by calling a function, but only be named.</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:complexType name="mathType">
            <xs:sequence>
                <xs:element ref="apply"/>
            </xs:sequence>
        </xs:complexType>
```

```
    <xs:element name="math" type="mathType">
        <xs:annotation>
            <xs:documentation>MathML block, within this block a subset of MathML is being used. More at
http://www.w3c.org/math</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="apply" type="applyType">
        <xs:annotation>
            <xs:documentation>MathML: Acts like a mathematical bracket</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:complexType name="applyType">
        <xs:choice minOccurs="0" maxOccurs="unbounded">
            <xs:element ref="apply"/>
            <xs:element ref="ci"/>
            <xs:element ref="cn"/>
            <xs:element ref="piecewise"/>
            <xs:element ref="max"/>
            <xs:element ref="min"/>
            <xs:element ref="eq"/>
            <xs:element ref="lt"/>
            <xs:element ref="gt"/>
            <xs:element ref="plus"/>
            <xs:element ref="minus"/>
            <xs:element ref="sin"/>
            <xs:element ref="cos"/>
            <xs:element ref="tan"/>
            <xs:element ref="power"/>
            <xs:element ref="times"/>
            <xs:element ref="divide"/>
            <xs:element ref="sum"/>
            <xs:element name="bvar" type="xs:string">
                <xs:annotation>
                    <xs:documentation>MathML: bounding variable, used by "sum" operation</xs:documentation>
                </xs:annotation>
            </xs:element>
        </xs:choice>
    </xs:complexType>
    <xs:element name="piecewise">
        <xs:annotation>
            <xs:documentation>MathML: mathematical "if..then" operator, example:
<piecewise>
                    <piece>
                        <apply>
                            <times/>
                            <cn>15.34</cn>
                            <ci>Punktanzahl</ci>
                        </apply>
                        <apply>
                            <lt/>
                            <ci>Punktanzahl</ci>
                            <cn>2</cn>
                        </apply>
                    </piece>
                    <otherwise>
                        <apply>
                            <plus/>
                            <apply>
                                <times/>
                                <cn>15.34</cn>
                                <ci>Punktanzahl</ci>
                            </apply>
                            <apply>
```

```
                        <times/>
                        <cn>10.23</cn>
                        <apply>
                            <minus/>
                            <ci>Punktanzahl</ci>
                            <cn>1</cn>
                        </apply>
                    </apply>
                </apply>
            </otherwise>
        </piecewise>
    </xs:documentation>
</xs:annotation>
<xs:complexType>
    <xs:sequence>
        <xs:element name="piece" maxOccurs="unbounded">
            <xs:complexType>
                <xs:sequence>
                    <xs:element ref="plus" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="times" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:choice minOccurs="0" maxOccurs="unbounded">
                        <xs:element ref="cn"/>
                        <xs:element ref="ci"/>
                    </xs:choice>
                    <xs:element ref="apply" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="gt" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="lt" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="ci" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="cn" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
        <xs:element name="otherwise" minOccurs="0">
            <xs:complexType>
                <xs:sequence>
                    <xs:choice minOccurs="0" maxOccurs="unbounded">
                        <xs:element ref="cn"/>
                        <xs:element ref="ci"/>
                        <xs:element name="apply" type="applyType"/>
                    </xs:choice>
                    <xs:element ref="times" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="ci" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="cn" minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
            </xs:complexType>
        </xs:element>
    </xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="cn" type="xs:string">
    <xs:annotation>
        <xs:documentation>MathML: Textfield for a number, e.g. 2.2345</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="ci" type="xs:string">
    <xs:annotation>
        <xs:documentation>MathML: Textfield for identifier, e.g. "price"</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="gt">
    <xs:annotation>
        <xs:documentation>MathML: "bigger than" operator</xs:documentation>
    </xs:annotation>
```

```
    <xs:complexType/>
</xs:element>
<xs:element name="lt">
    <xs:annotation>
        <xs:documentation>MathML: "Smaller then" operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="times">
    <xs:annotation>
        <xs:documentation>MathML: Times operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="divide">
    <xs:annotation>
        <xs:documentation>MathML: Division operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="minus">
    <xs:annotation>
        <xs:documentation>MathML: Minus operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="plus">
    <xs:annotation>
        <xs:documentation>MathML: Plus operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="max">
    <xs:annotation>
        <xs:documentation>MathML: Maximum operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="min">
    <xs:annotation>
        <xs:documentation>MathML: Minimun operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="eq">
    <xs:annotation>
        <xs:documentation>MathML: Equal operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="sin">
    <xs:annotation>
        <xs:documentation>MathML: Sinus operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="cos">
    <xs:annotation>
        <xs:documentation>MathML: Cosinus operator</xs:documentation>
    </xs:annotation>
    <xs:complexType/>
</xs:element>
<xs:element name="tan">
```

```
            <xs:annotation>
                <xs:documentation>MathML: Tangence operator</xs:documentation>
            </xs:annotation>
            <xs:complexType/>
        </xs:element>
        <xs:element name="power">
            <xs:annotation>
                <xs:documentation>MathML: Power operator</xs:documentation>
            </xs:annotation>
            <xs:complexType/>
        </xs:element>
        <xs:element name="sum" type="xs:string">
            <xs:annotation>
                <xs:documentation>MathML: Sumeration operator</xs:documentation>
            </xs:annotation>
        </xs:element>
        <!--====================other elements====================-->
        <xs:element name="title" type="xs:string">
            <xs:annotation>
                <xs:documentation>Each productGroup may have a title, but each product must have a
title.</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="abstract" type="xs:string">
            <xs:annotation>
                <xs:documentation>Abstracts may be used to give some more background information about the
productGroup or the product. Complete product description may be made in an ISO19115 description and referenced by a
productId.</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="offerDuration" type="xs:string">
            <xs:annotation>
                <xs:documentation>Valid timeframe for that offer.</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:complexType name="productStatusType">
            <xs:sequence>
                <xs:element name="statusInfo" type="xs:string">
                    <xs:annotation>
                        <xs:documentation>Textual information about a status.</xs:documentation>
                    </xs:annotation>
                </xs:element>
            </xs:sequence>
            <xs:attribute name="date" type="xs:string" use="required"/>
            <xs:attribute name="time" type="xs:string" use="required"/>
            <xs:attribute name="statusCode" use="required">
                <xs:simpleType>
                    <xs:restriction base="xs:NMTOKEN">
                        <xs:enumeration value="createOfOffer"/>
                        <xs:enumeration value="analogDelivery"/>
                        <xs:enumeration value="ordered"/>
                        <xs:enumeration value="orderProcessingFailed"/>
                        <xs:enumeration value="readyForDelivery"/>
                        <xs:enumeration value="delivered"/>
                        <xs:enumeration value="accounting"/>
                        <xs:enumeration value="endOfTransaction"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:attribute>
        </xs:complexType>
        <xs:complexType name="productStatusListType">
            <xs:sequence>
                <xs:element ref="productStatus"/>
```

```
            <xs:element name="statusHistory">
                <xs:complexType>
                    <xs:sequence>
                        <xs:element ref="productStatus" minOccurs="0" maxOccurs="unbounded"/>
                    </xs:sequence>
                </xs:complexType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="transactionNumber" type="xs:string">
        <xs:annotation>
            <xs:documentation>This number acts as an ID within processing steps. A transactionNumber may target to a
productGroup, if a processing groups all "product" data files into one, e.g. zip compression, or in a "product", if each
packet will be delivered separately.

The WPOS "orderProduct" sets a transactionNumber in a XCPF instance and sends it to the client, who will request a data
product file with the WPOS request "getProduct" and this transaction number.</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="inheritance" type="inheritanceType">
        <xs:annotation>
            <xs:documentation>The inheritance method provides a very powerful and useful optimisation for large data
entries. It may contain most repeated XCPF elements for inheritance, e.g. contract information and calculation blocks.
Inheritance can be overwritten in following productGroups or products</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:complexType name="inheritanceType">
        <xs:sequence>
            <xs:element ref="title" minOccurs="0"/>
            <xs:element ref="abstract" minOccurs="0"/>
            <xs:element ref="contractInformation" minOccurs="0"/>
            <xs:element ref="calculation" minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="contractInformation" type="contractInformationType">
        <xs:annotation>
            <xs:documentation>Orders can be processed under curtain circumstances, which must be declared in a
contract.</xs:documentation>
            <xs:documentation>Orders can be processed under curtain circumstances, which must be declared in a
contract.</xs:documentation>
            <xs:documentation>Orders can be processed under curtain circumstances, which must be declared in a
contract.</xs:documentation>
            <xs:documentation>Orders can be processed under curtain circumstances, which must be declared in a
contract.</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="address" type="addressType">
        <xs:annotation>
            <xs:documentation>Contact information,
In the case of a customer use, there might be more entries.</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="productStatus" type="productStatusType">
        <xs:annotation>
            <xs:documentation>Current status with time, date and statuscode attributes. The status changes when a
WPOS operation is processed</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="productGroup" type="productGroupType">
        <xs:annotation>
            <xs:documentation>With the use of productGroup elements, pricing catalog can be arranged.
</xs:documentation>
```

```
            <xs:documentation>With the use of productGroup elements, pricing catalog can be arranged.
</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="productStatusList" type="productStatusListType">
        <xs:annotation>
            <xs:documentation>The Web Pricing &amp;amp; Ordering Service uses an instance of the XCPF pricing model to
store order process information into this status list. </xs:documentation>
        </xs:annotation>
    </xs:element>
</xs:schema>
```

6 Reference

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