

SOAP 1.2, MTOM and their applications

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Agenda

- SOAP 1.2
- XOP, MTOM and Resource Header
- Canon

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SOAP 1.2

SOAP – Background

- Web success
 - Easy information sharing
 - Built on HTML and HTTP
- Logical evolution: applications over the web
 - Loose coupling
 - Use XML and HTTP

SOAP 1.2 Standard

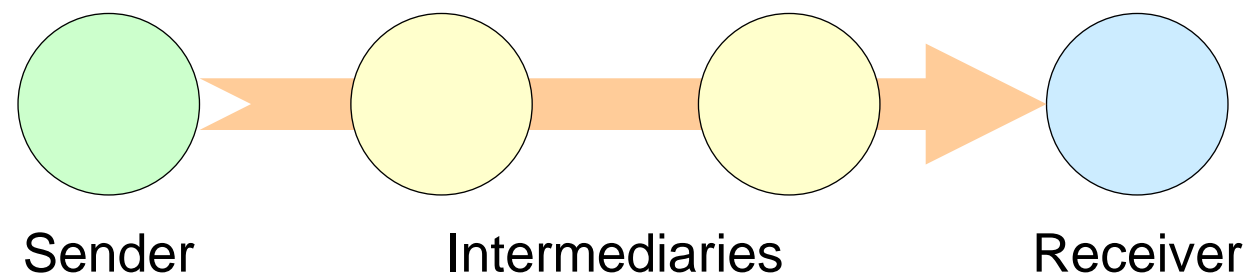
- Standardization process
 - W3C Working Group
 - From September 2000 to June 2003
- Result
 - SOAP Version 1.2 Part 0: Primer
 - SOAP Version 1.2 Part 1: Messaging Framework
 - SOAP Version 1.2 Part 2: Adjuncts

SOAP 1.2

Messaging Framework

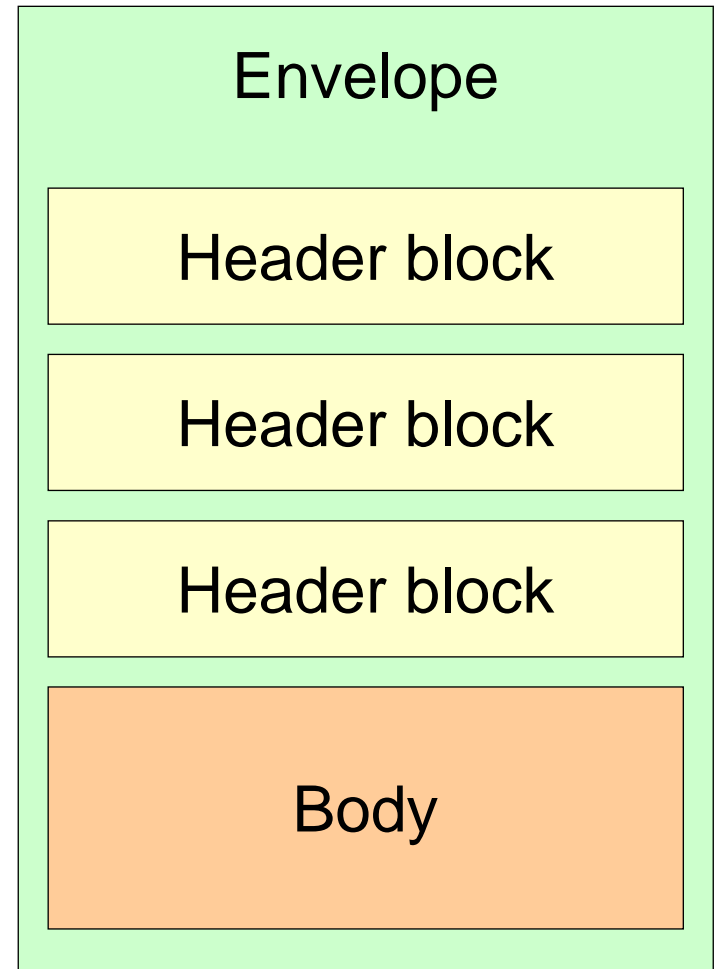
SOAP Message

- Transferred between nodes:
 - From a sender
 - To a receiver
 - Through intermediarie(s)



SOAP Envelope

- XML Construct
- Body
 - For ultimate receiver
- Header block
 - For any node
 - Processing may be mandatory:
`mustUnderstand`



SOAP Message Processing

- Main steps:
 - Check message can be processed
 - Find header blocks targeted at the node
 - Look for `mustUnderstand`
 - Process message
 - Process identified header blocks
 - Process body (ultimate receiver)
 - Transmit message
 - Send modified message (intermediary)

SOAP Fault

- Failure is indicated by a fault
- SOAP Fault
 - Contained in Envelope Body
 - Indicates the type of failure
 - May contain:
 - Node where fault happened
 - Application related details

SOAP Binding Framework

- SOAP has:
 - Message structure
 - Processing rules
- To transmit messages another protocol is needed
- Binding Framework
 - Rules for defining how a protocol is used to transmit SOAP messages

SOAP Extensibility

- SOAP Features
 - Extension of the messaging framework
- Through Processing Model
 - Expressed as Header Block (SOAP Module)
 - Can use `mustUnderstand`
- Through Binding Framework
 - Expressed using underlying protocol

SOAP 1.2

Adjuncts

SOAP RPC

- Convention for doing RPC
- Invocation
 - Element with function name in Body
 - Sub-element for each parameter
- Response
 - Element representing result in Body
 - Sub-element for each parameter

SOAP Data Model

SOAP Encoding

- SOAP Data Model
 - Mapping convention from application data to XML
 - Used by SOAP RPC
- SOAP Encoding
 - Serialization rules for Data Model
 - SOAP Part 2 defines an Encoding
 - Other Encoding can be created

SOAP MEP (Message Exchange Pattern)

- MEP
 - Template for an exchange of several SOAP messages
 - Provides an abstraction over the underlying protocol
- MEP defined by standard
 - SOAP Request-Response
 - SOAP Response

SOAP HTTP Binding

- Binding of SOAP to HTTP
- Support two MEPs
 - SOAP Request-Response
 - SOAP Response
- Support Web Method Feature
 - Use either GET or POST

XOP, MTOM and Resource Header

Binary Data in SOAP

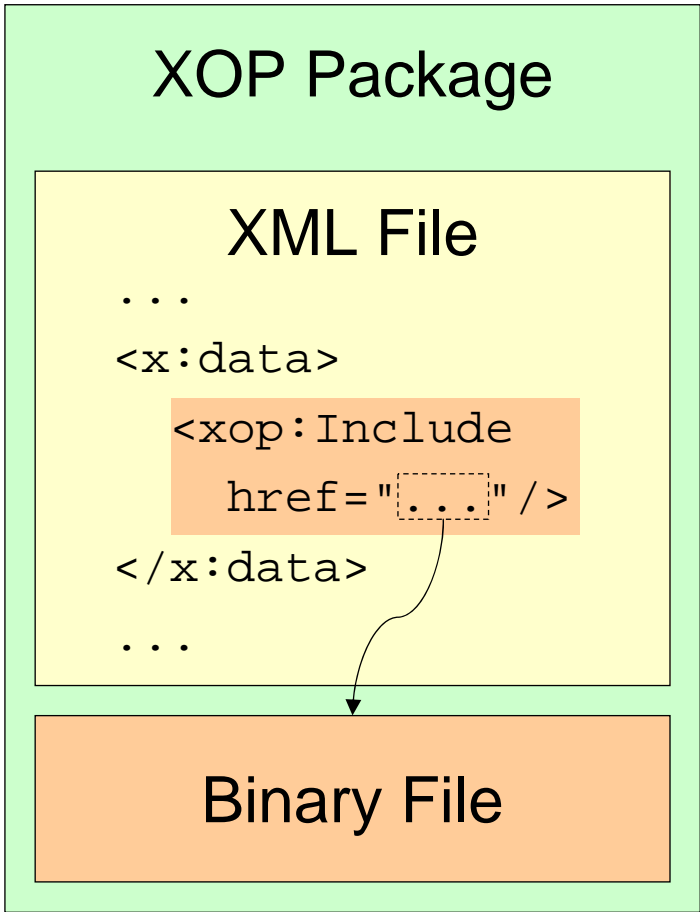
- Problem: including binary data in a SOAP message
 - Need to encode data
 - base64 encoding: 33% size increase
- XOP: binary data in XML documents
- MTOM: application of XOP to SOAP

XOP Introduction

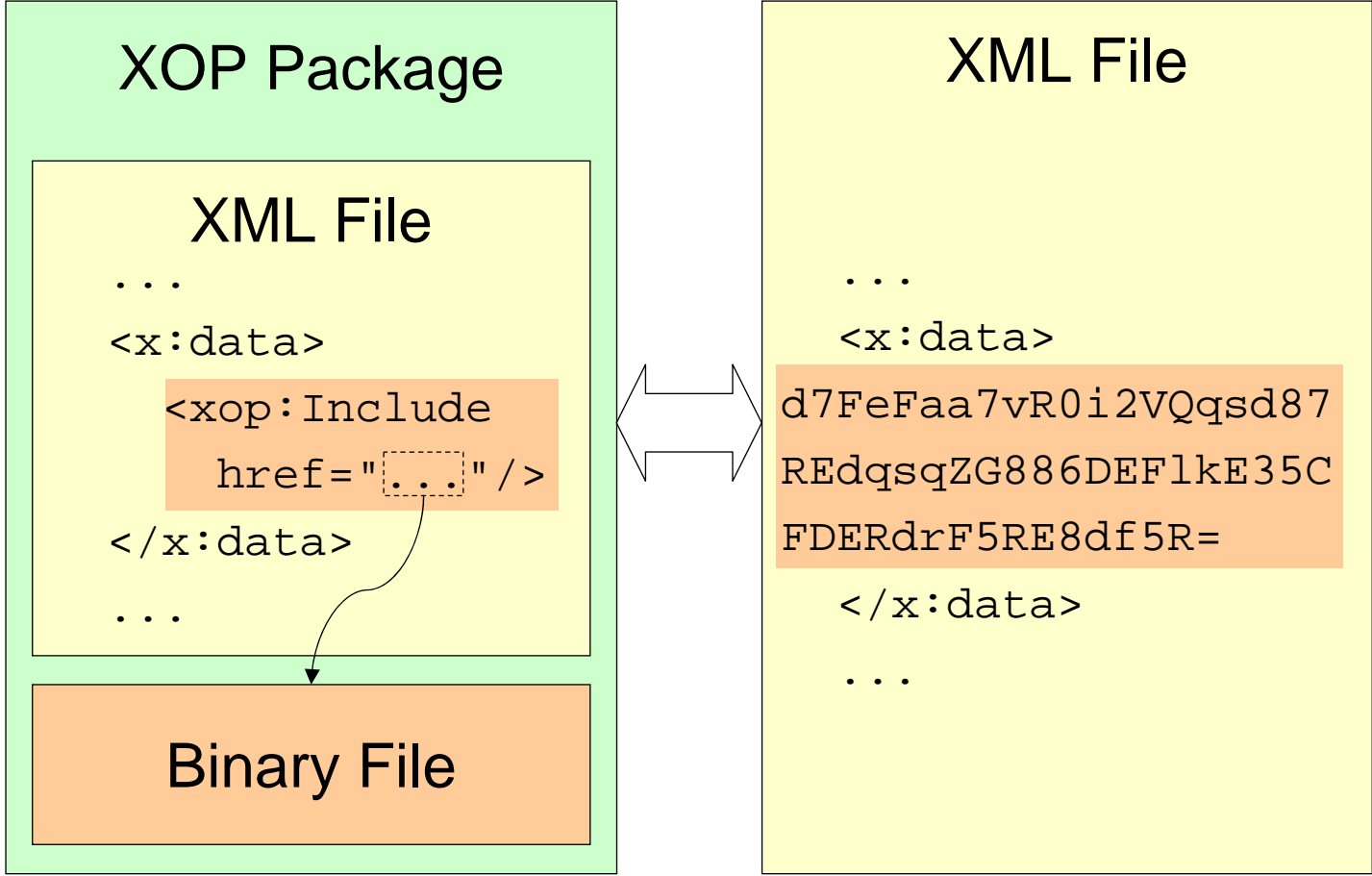
- XML-binary Optimized Packaging
- Goal: serialize efficiently XML Infosets containing binary data
- Uses XOP Package construct for serialization

XOP Package

- XML Linked to binary data
 - `xop:Include` element
- XML and binary data enclosed in XOP Package



XOP Logical View



Serialization

Logical View

XOP Advantages

- At application layer, everything is XML
 - Compatible with legacy applications
 - Efficient XOP-aware applications
- At serialization layer
 - XOP Package: more compact
 - Can be compatible with legacy XML libraries

MTOM

- Message Transmission Optimization Mechanism
- SOAP Feature for using XOP with SOAP
- Use MIME Multipart/Related for XOP Package
- Extension to the HTTP Binding

Resource Representation Header Block

- SOAP Feature for including representations of Web resources
- Representation carried in a Header Block
 - Stored in base64
- Designed to optimize when used with MTOM

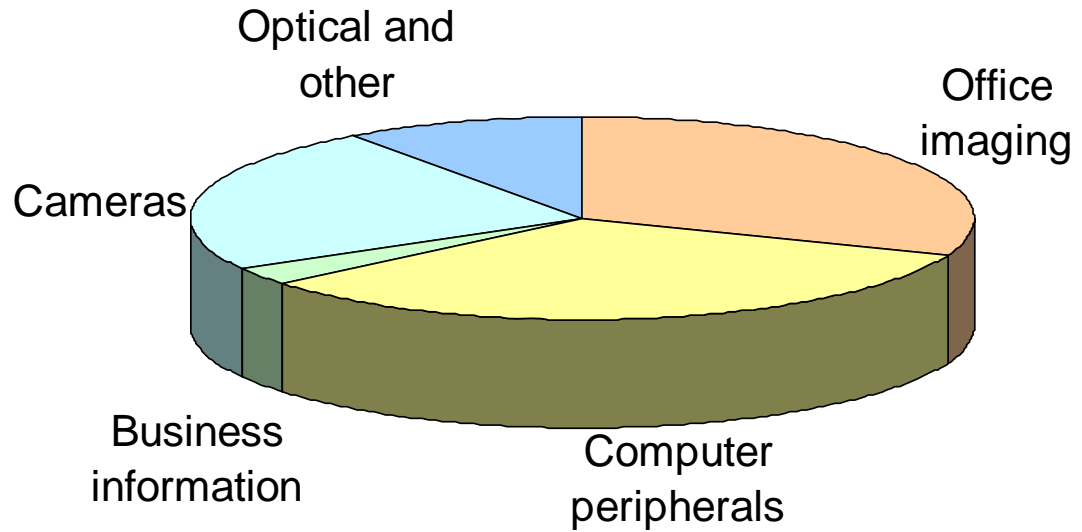
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- Net sales: 26 billions €
- Employees: 115,000

Sales by products



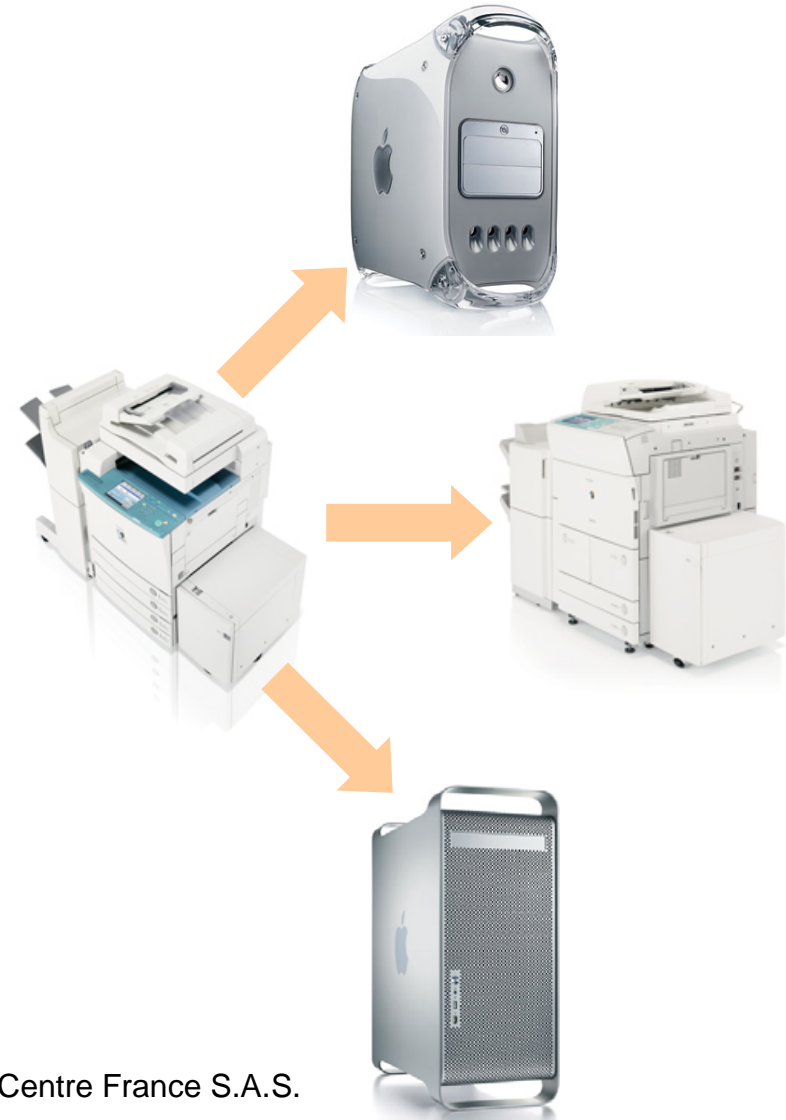
Canon Research Centre France

- European R&D centre for Canon
- 70 employees
- Field of expertise
 - Image processing
 - Networks
 - Internet technologies



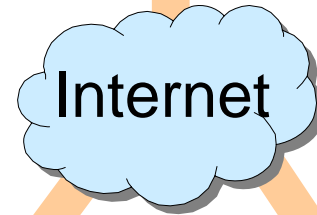
Web Services for copiers

- Provide extension mechanism
 - Using functionalities from another copier
 - Retrieving resource from a PC



Web services for cameras

- Increase communication possibilities
 - Sharing images over the Internet



Thank you!

Question?