

TypeX Message Exchange Patterns & Deployment Architectures

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Agenda

- TypeX Background
- TypeX Exchange Patterns
- TypeX Implementation Stacks
- Deployment Architectures
- Using TypeX

Reliable Messaging; a need for data exchange between companies

- Some Areas of Application



What is Changing in Operational Messaging? The Systems and Technology Perspective

Systems supporting operations

- New applications are emerging
- Legacy systems are being replaced by open systems –
- More data needs to be processed and stored
- Systems need to be more flexible

Technologies supporting operations

- Use of modern databases are expanding
- Adoption and use of XML
- New trends with SOA and Web Services
- Availability of staff with knowledge on some legacy technologies is shrinking

This requires

more powerful and future proof messaging standards and platforms

The ATI Messaging Needs Calls for a Move to XML Based Messaging – i.e. TypeX

XML is the future format, being

- Dynamic
- Flexible
- Supportive of much more information rich messaging

Use of XML will bring down

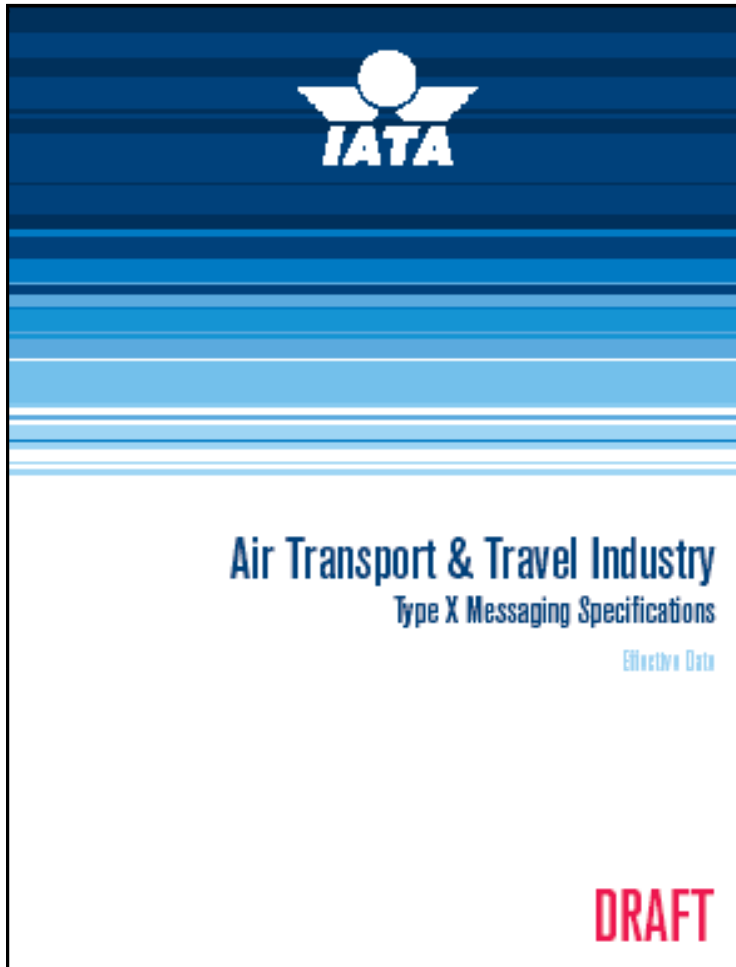
- Development cost
- Development time
- Dependency on hard-to-get expertise

And increase available performance

So to make sure that your XML messages are all delivered worldwide TypeX is developed as standard and suite of services

Available Documentation

TypeX Specification



- Specifies TypeX Message (TXM) structure and necessary headers
- Specifies TXM – SOAP mapping
- Specifies TypeX addressing
- Specifies reliability protocol XATAP
- Specifies Session Management XSM
- Specifies all TypeX related Schema
- TypeX Specification adopted Sept 06
- **TypeX is planned to be published as IATA SCR Volume 7 in December**

Industry Benefits

Reduced Software Development and Maintenance Costs

- Tools supporting the technology enable more automated development of code for interfaces
- Benefits multiply over many discrete interfaces airlines maintain for partner communications
 - Supply chain
 - Access to partners and network applications
 - Bi-lateral relationships, such as for eTicketing

Largest impact to new applications, or when legacy applications are refreshed

- e.g. migration to new OS, or strategic application replacement

Quicker application development time - Speeding up the development of new business applications

- Due to self describing nature of technology, automated tools, and less need for bi-lateral agreements

More readily handle new collaboration requirements

- eTicketing, eFreight, spec2000XML
- Customs and border control security requirements
- Partnerships
- New business models

Lower cost of change to maintain partner interfaces translates into increased business agility

TypeX in a Nutshell



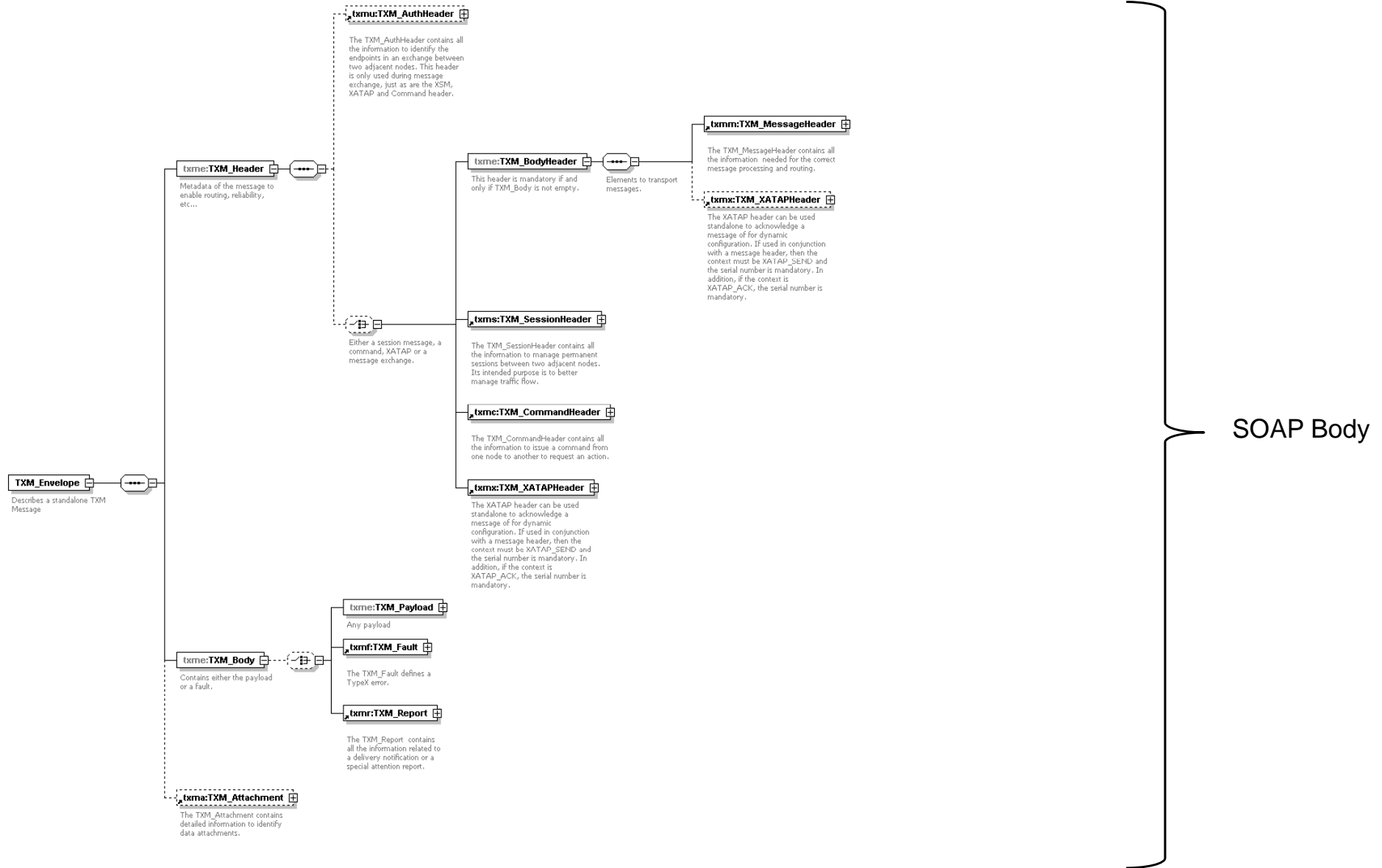
Overview

- In its simplest form, the protocol consists of sending a payload with a message header. The transport layer will send some form of acknowledgement
- If reliability is required, then a XATAP header is joined to the message header. The receiver will return a XATAP acknowledgement
- If session management is required, then an XSM session must be established before messages may be sent
- Note that XSM and XATAP are independent in that either or both may be used
- In addition , regardless of the scenario, Command headers may be sent in order to control flow or repeat messages
- Finally, the sender may request a report (delivery or non-delivery)

TypeX: Properties

- IATA TypeB and ICAO AFTN message compatibility
- Support for all standard ATI store and forward message exchange patterns
- Full message assurance support for application to application delivery
- Permits detection of duplicate messages
- Permits messaging ordering
- Session management
- SOAP binding
- Security options
- Messaging priority
- Grouping of messages
- Multicast (one message to many recipients)
- End-to-End addressing (originator to recipient)
- Rich addressing scheme backward compatible with current ATI addressing
- End-to-End delivery notification (ultimate receiver or recipient to originator)
- Service command messages
- Openness by providing free fields
- Support for attachments

TypeX Message to SOAP Mapping



TypeX: Sample Message over SOAP

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope
  xmlns:txme="http://schema.typex.aero/txm/envelope">
  <soap:Header>
    ...
  </soap:Header>
  <soap:Body>
    <txme:TXM_Envelope> ... </txme:TXM_Envelope>
  </soap:Body>
</soap:Envelope>
```

TypeX Message Possible Contents

Context	Header Options					Body
	XSM	XATAP	Command	Message	Auth	
XSM Open/Close Session	M	NA	NA	NA	M	NA
XSM query	M	NA	NA	NA	M	NA
XATAP Send	NA	M	NA	M	M	NA
XATAP Ack	NA	M	NA	NA	M	NA
Command Flow Request	NA	NA	M	NA	M	NA
Command Repeat Message	NA	NA	M	NA	M	NA
Message Send	NA	Optional	NA	M	M	M *

* may include attachments, M=Mandatory, NA=not available

TypeX Security

- **TypeX security capabilities include:**
 - **Content Integrity**
 - **Confidentiality**
 - **Authentication**
 - **Non repudiation**
- **Functionality to be enabled by the use of PKI for encryption and digital signature mainly by the end users**
- **Uses standard OASIS Web Services Security framework defined as SOAP extensions i.e. WS-Security with W3C XML Encryption & XML Digital Signature, WS-Trust, WS-Federation, WS-SecureConversation, WS-SecurityPolicy, SAML**
- **Implementation guidelines for TypeX is part of the work plan**

TypeX Exchange Patterns

- TypeX Message Exchange Patterns (MEP) govern end to end exchanges
- TypeX supports the following MEPs:
 - Asynchronous Request/Response via call back, conversation
 - Send Only, one way exchange with required asynchronous response
 - Fire & Forget, send but no response is expected



Standards

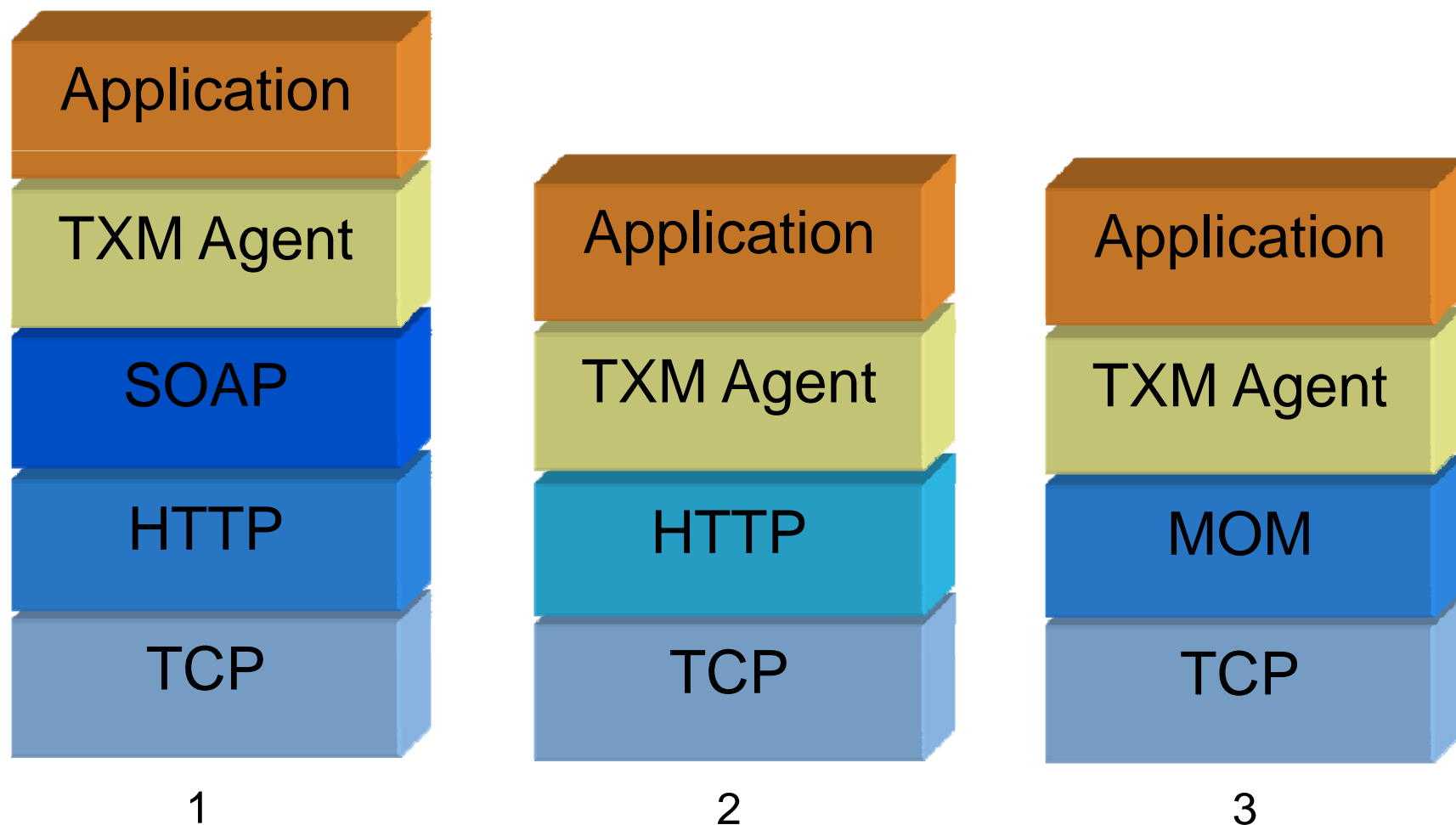


Technology



Services

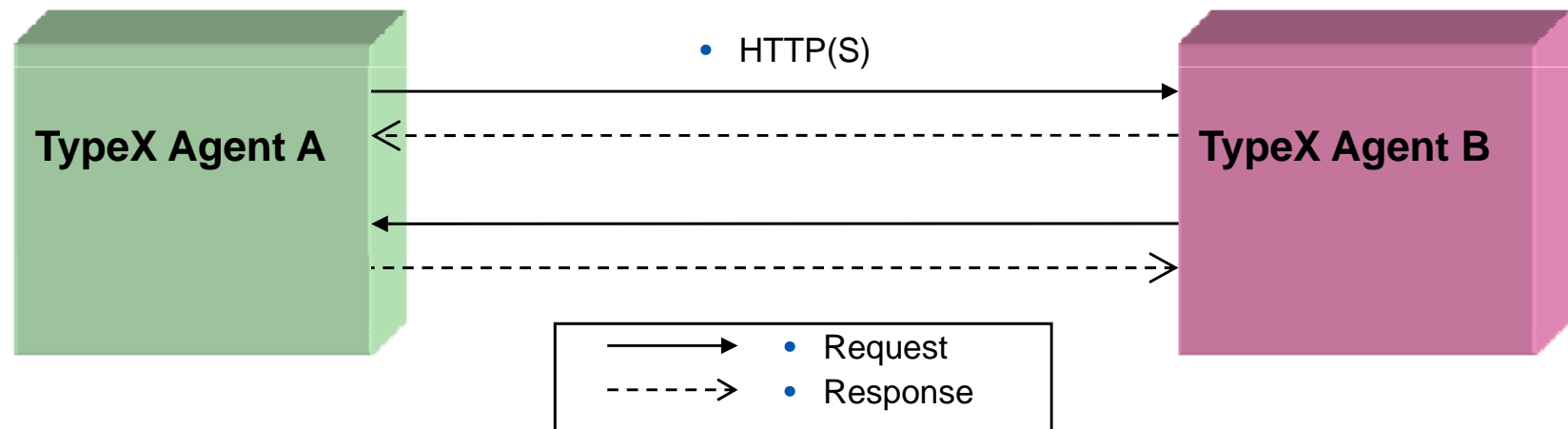
Recommended TypeX Stacks



TypeX over HTTP:

Permanent two-way deployment view

Recommended for users with large throughput in both directions

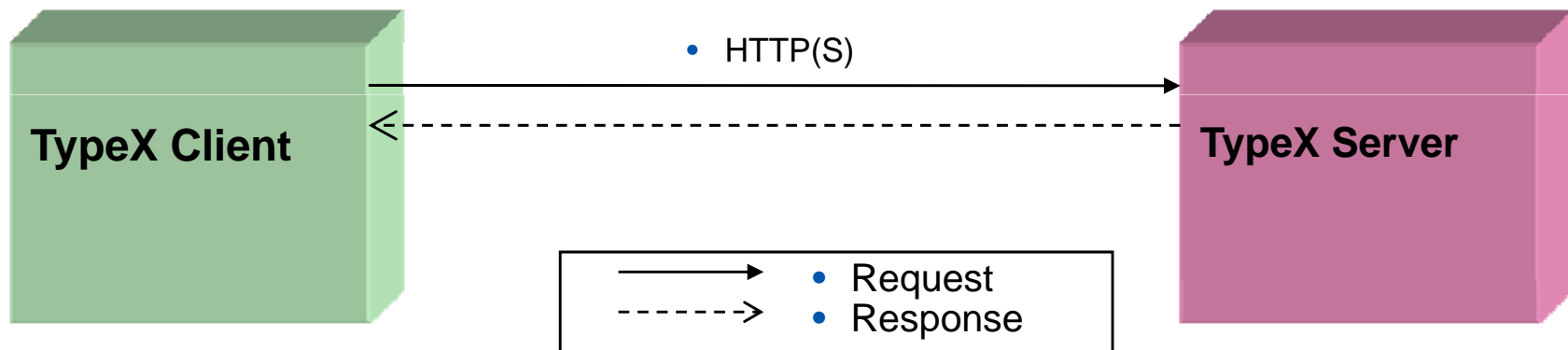


Characteristics:

- Permanent connections
- Dual HTTP connection, XSM & XATAP are enforced
- Service with a single operation: *sendMessage*

TypeX over HTTP:

Permanent one-way deployment view



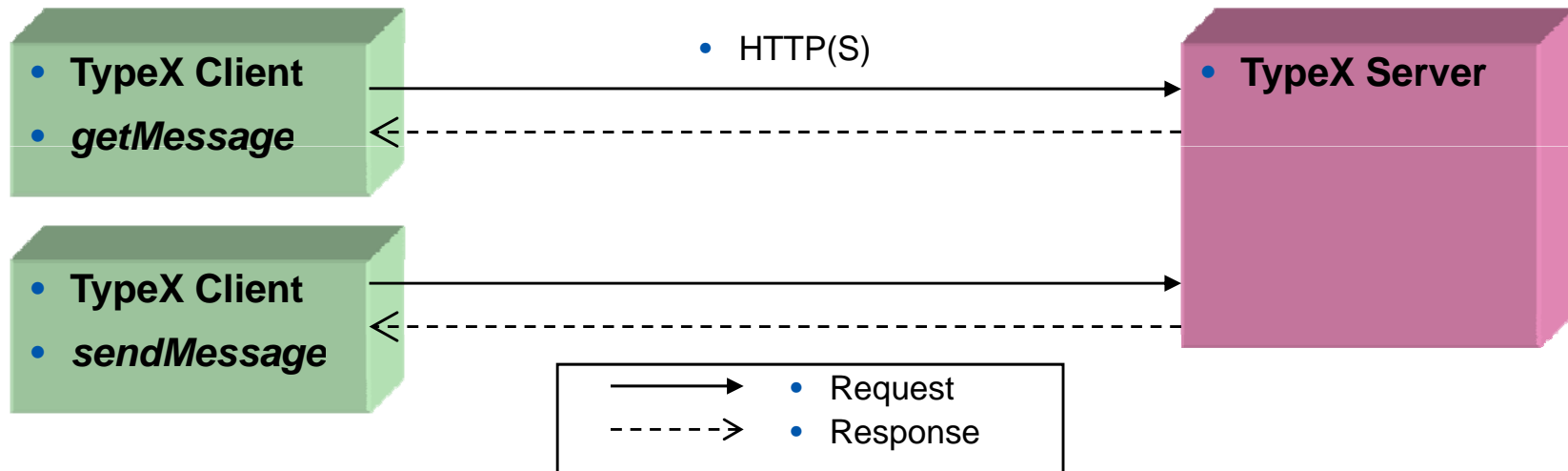
Characteristics:

- Permanent single connection
- XSM & XATAP are enforced
- Service with two operations: *sendMessage* & *getMessage*

TypeX over HTTP:

Non-Permanent one-way deployment view

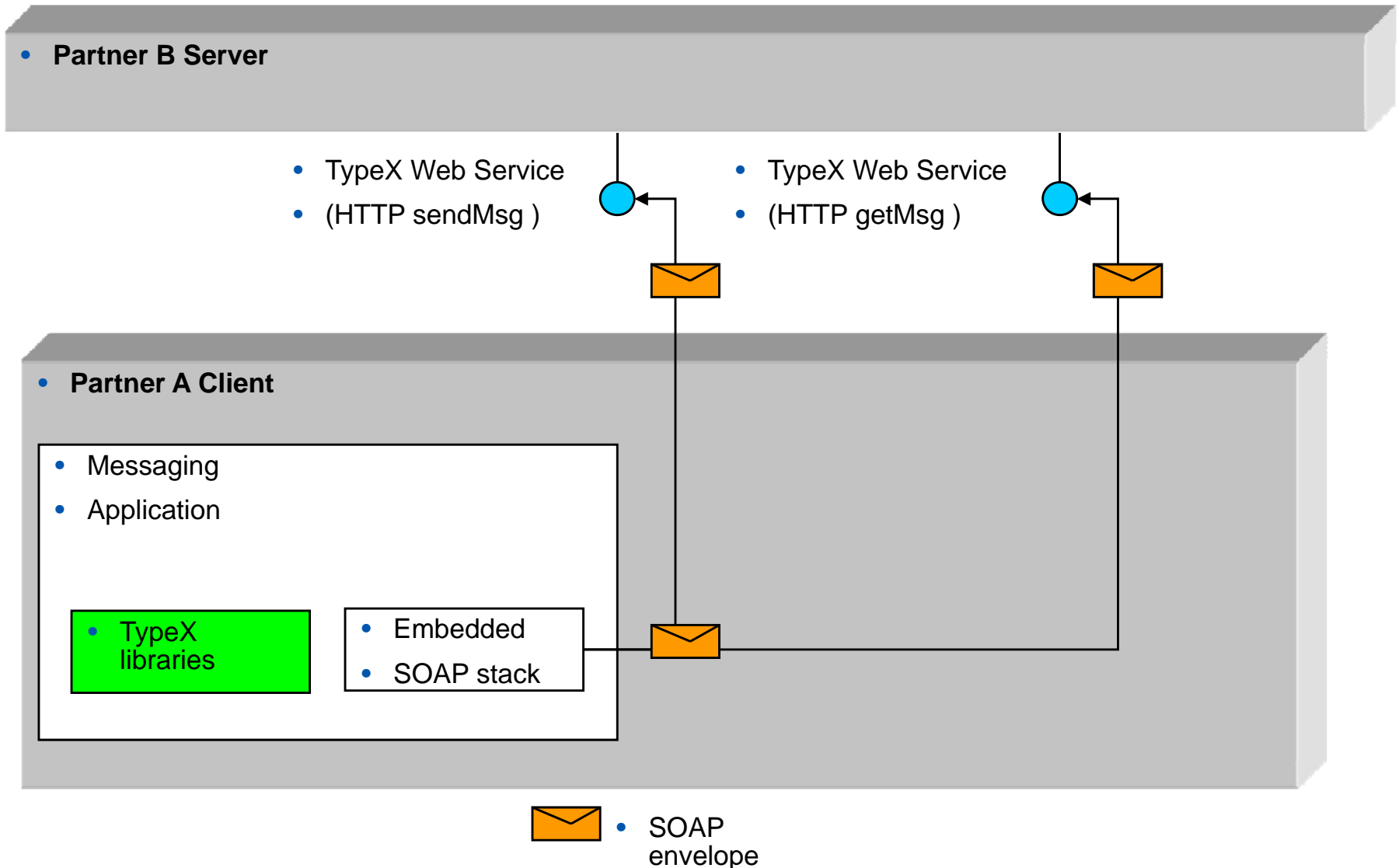
Recommended for users with low throughput; get or send message & disconnect



Characteristics:

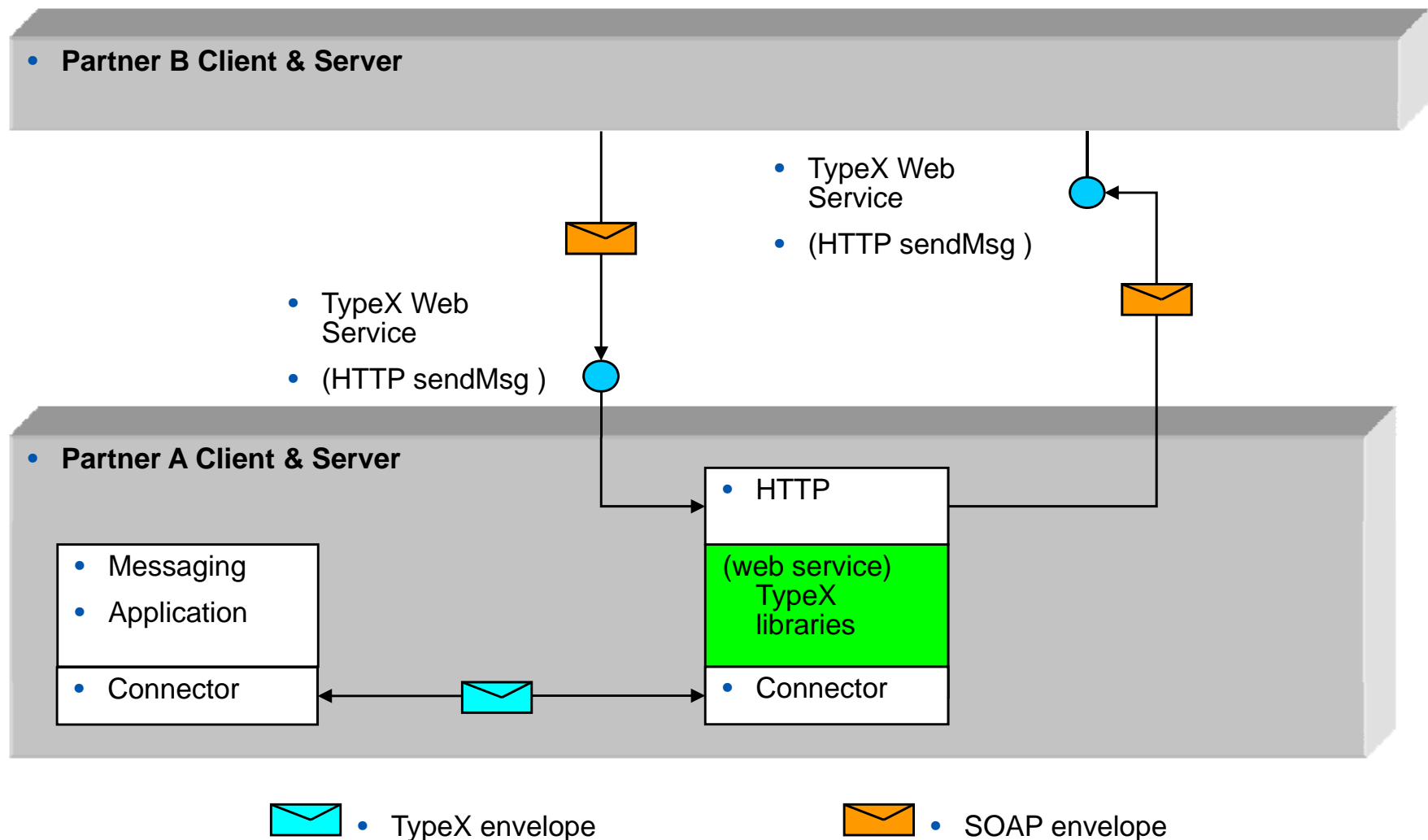
- Non-permanent Connection
- Single HTTP connection, a single request/response
- No support for reliability and session management
- Two services, each with a single operation:
 - *sendMessage*: the client sends an envelope
 - *getMessage*: if a message is available, it is returned in the response

TypeX Deployment Architectures: TypeX in a stand-alone application



TypeX Deployment Architectures:

TypeX in a 2 Way Web Service with reliability



TypeX Deployment Architectures: TypeX in a SOA & ESB Deployment

• Partner B

- TypeX Web Service
- (HTTP sendMsg)

- TypeX Web Service
- (HTTP getMsg)

• Partner A

- Messaging
- Application
- (internal)


- Message Broker

- Transformation
- Service
- (internal service)

- Messaging
- Service
- connector

- TypeX libraries
- (Internal TypeX Service)
- connector
- HTTP connector

- HTTP connector
- TypeX Service (Proxy)

 • Native message format

 • TypeX envelope

 • SOAP envelope

What Characterizes the Typical Type X User

Three requirements may move a user to look at TypeX

1. Plans for an open platform
2. Requirement to support new messages
3. Need to improve transaction cost

What should be done to implement and use TypeX

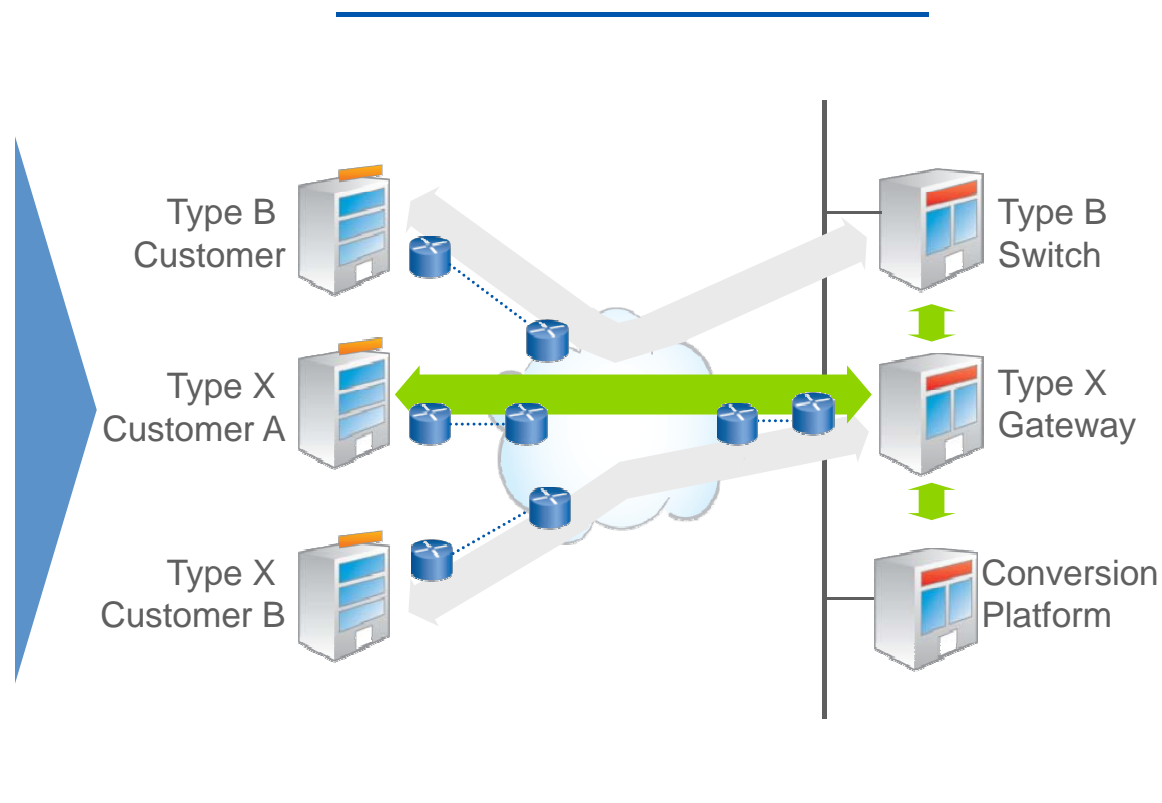
1. Prepare an “open” platform
2. Select options and implement TypeX or use a package
3. Use a service provider for seamless exchanges



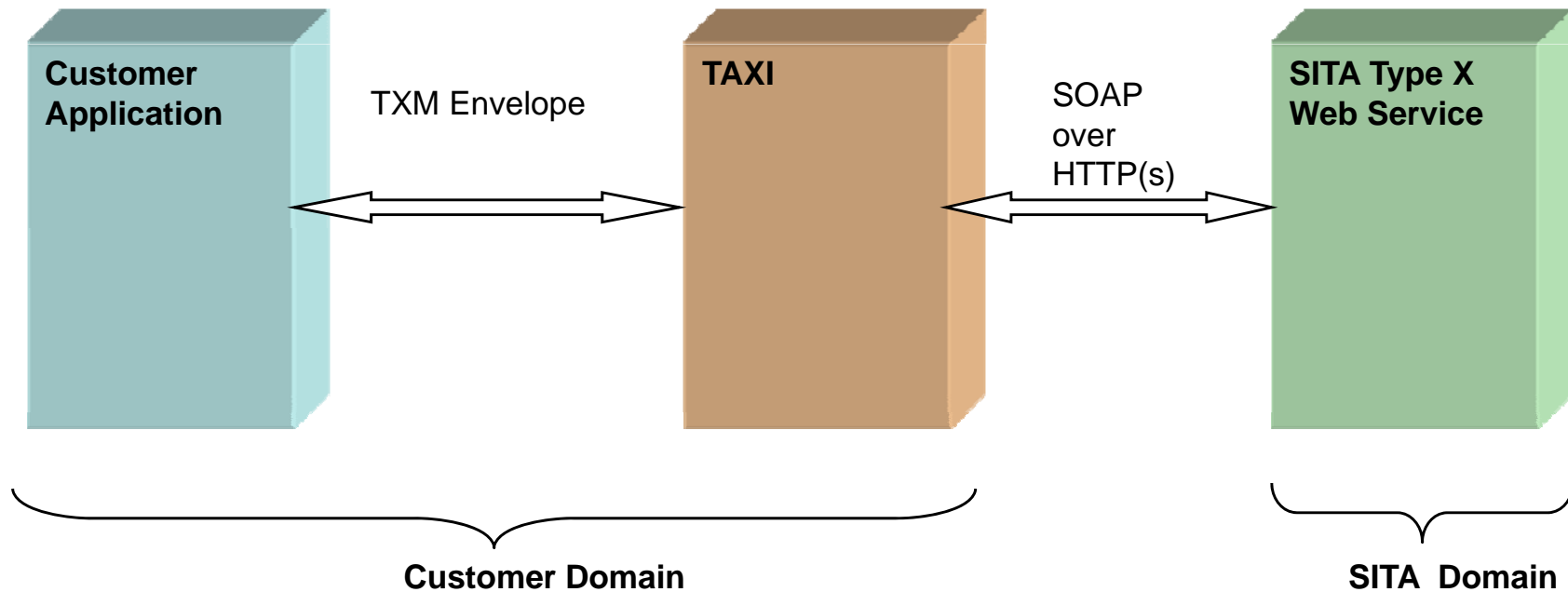
The Current TypeX Service Deployment

Feature Pack 1 Service

- Type X Connectors using:
 - SOAP/HTTP
- Type X–Type B Gateway
- Business Data Conversions
- Customer software package and kit for easy implementation of connection
- Professional Services



TypeX Customer Package



Thank You

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