A brief introduction to ISO 28005-1

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DYNAPORT Webinar
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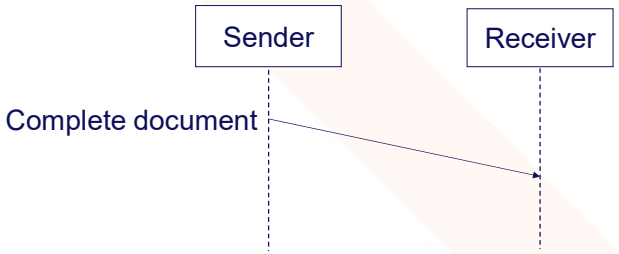
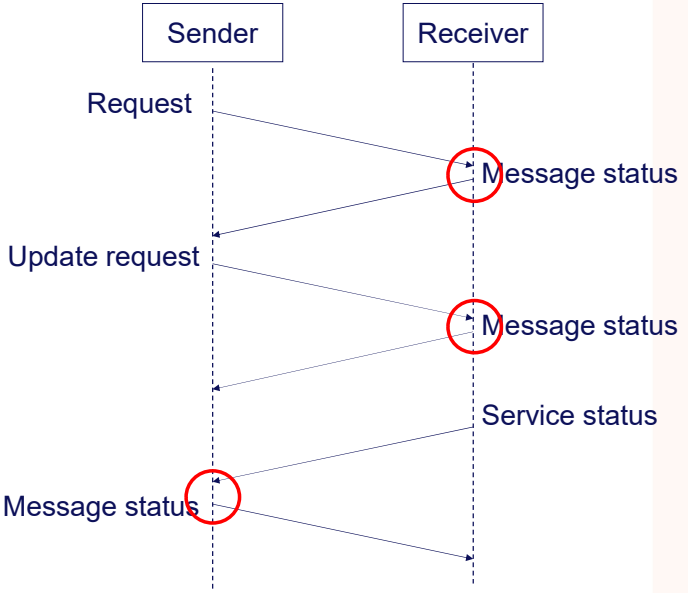
API versus electronic document exchange

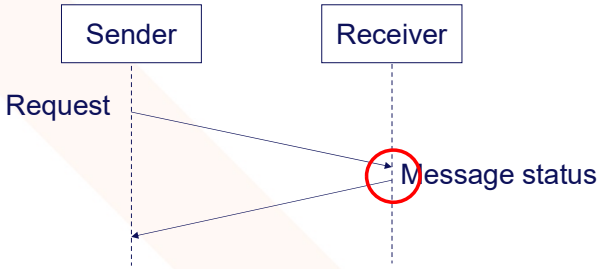


Electronic document exchange



Application programming interface
API = Protocol + Message structure + Data

REST API: Representational state transfer API

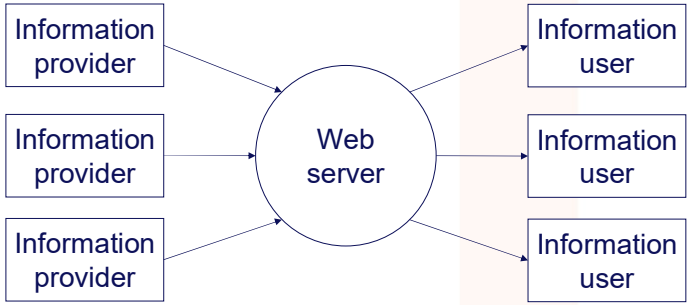


Protocol: HTTP

Message structure + Data: HTTP defined

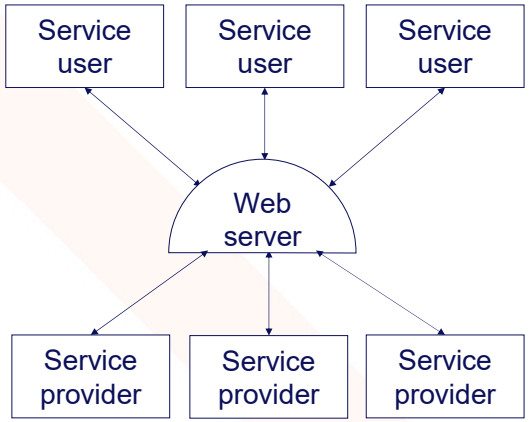
Specific rules for how HTTP is used

Note: HTTP is a protocol that is used, e.g. for web browsers. HTTPS (secure HTTP) is the commonly used variant, but the protocol definition is still HTTP.

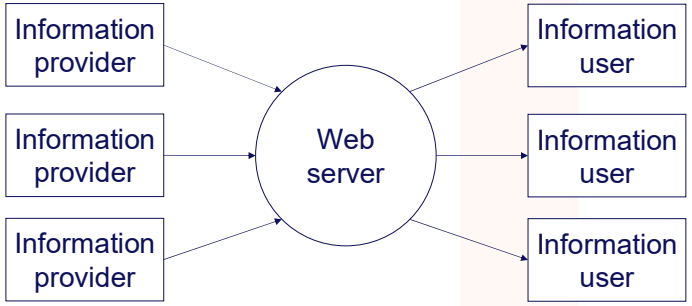


REST APIs are much used for «microservices» architectures.

REST is not used by ISO 28005

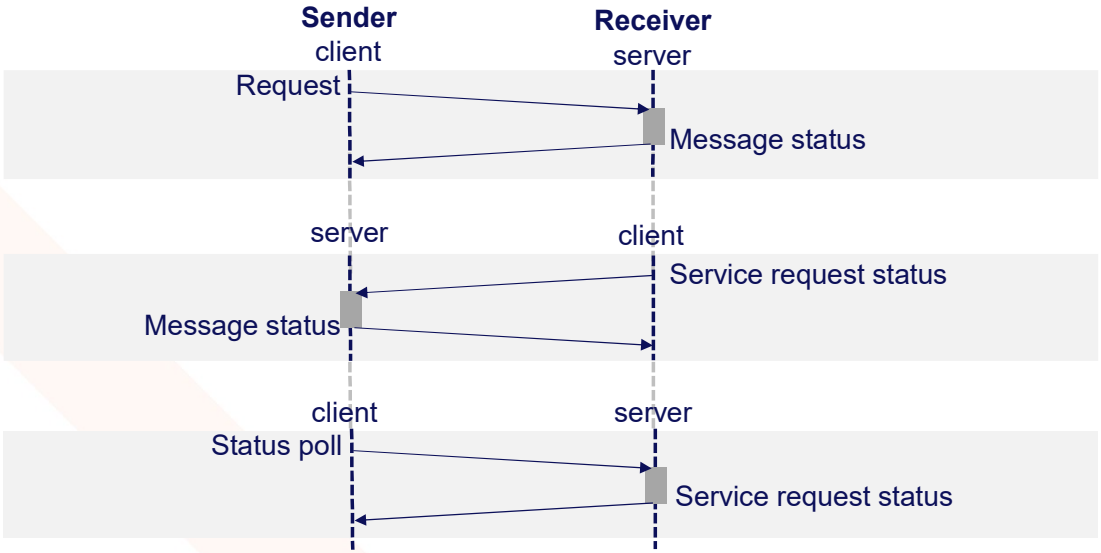


ISO 28005 physical services architecture.



Example of REST «microservices» architecture.

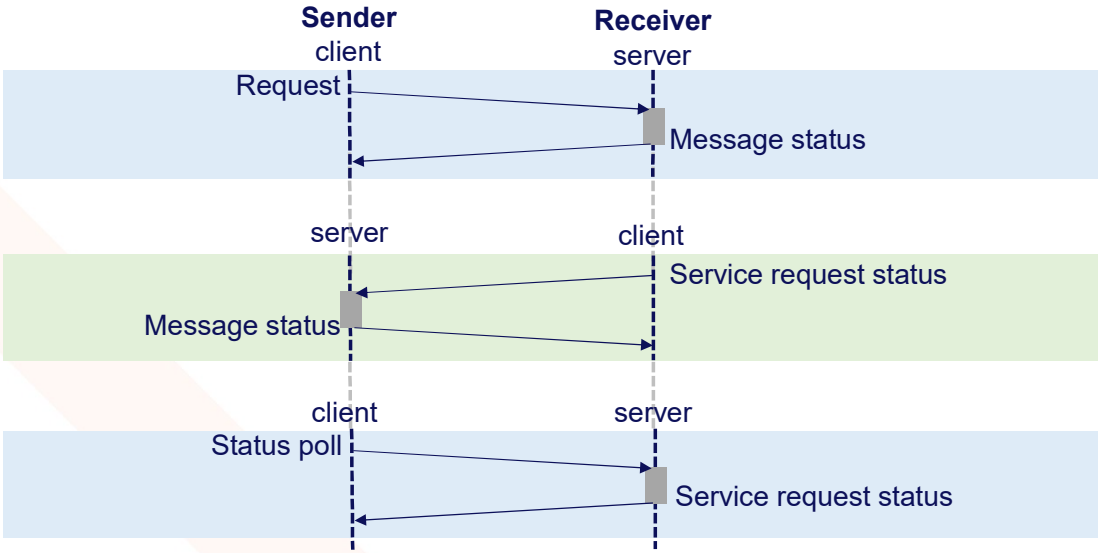
Sender/Receiver versus client/server



Sender:
Party that requests a service from a receiver.

Receiver:
Party that receives requests and provides services.

Sender/Receiver versus client/server



Sender:
Party that requests a service from a receiver.

Receiver:
Party that receives requests and provides services.

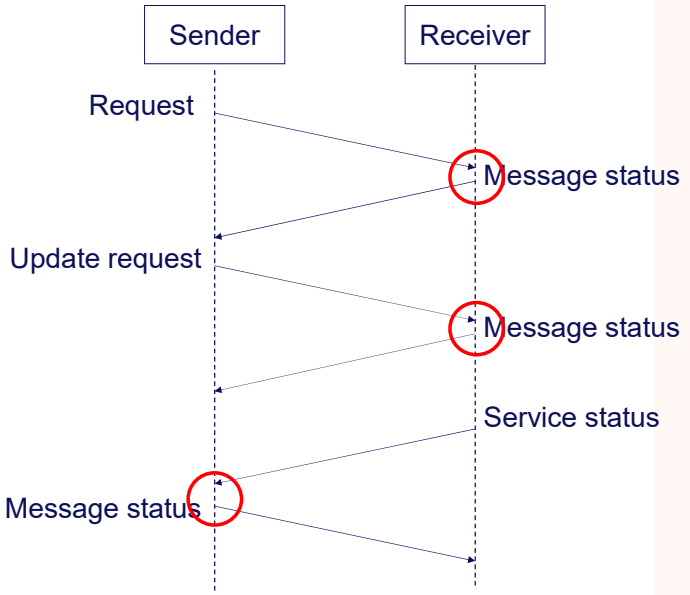
Asynchronous:
Sender can be both server and client.

Synchronous:
Sender can only be client. Uses polling of receiver to check status.

API versus API Access Point as used by ISO 28005

API Access Point:
Protocol: Standardized (HTTP)
Message structure: Standardized, flexible

Each API:
Use standard API Access point
Different data in flexible message



API = Protocol + Message structure + Data

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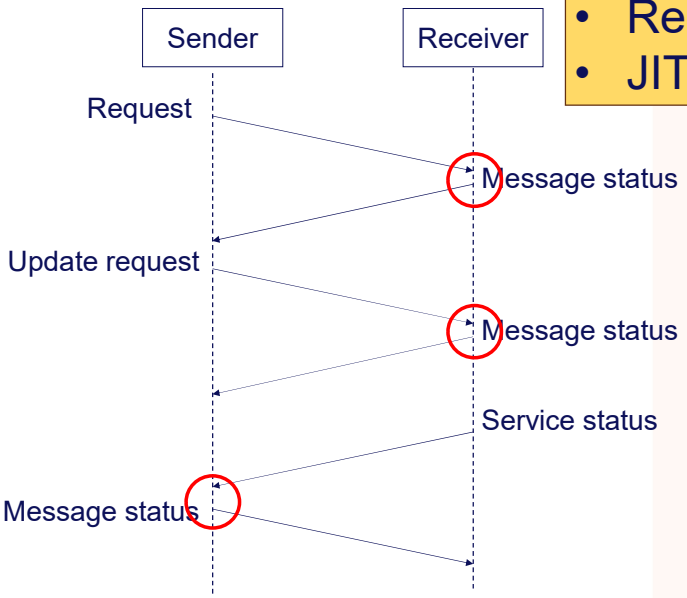
Choreography

Message + Data

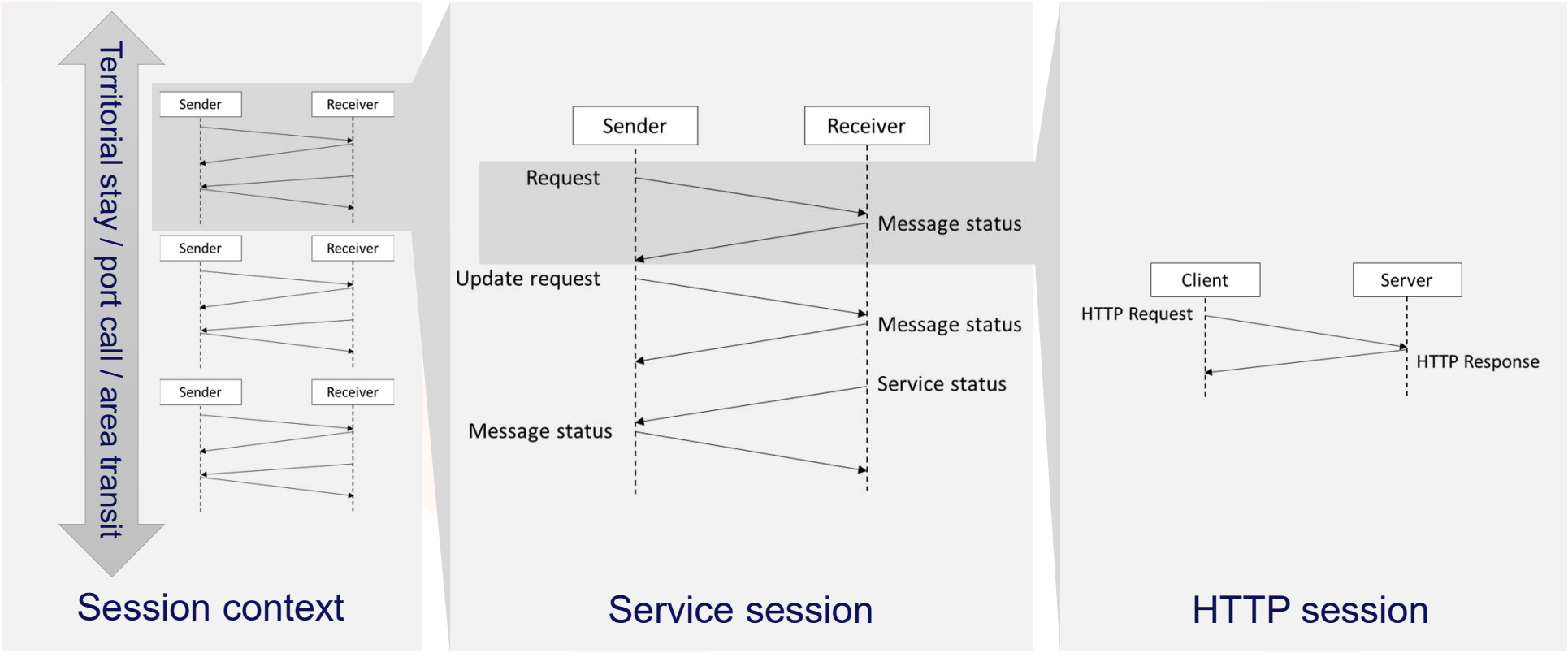
Message transport layer
HTTP



Example services:
- Send one document
- Order tugs
- Request terminal berth
- JIT negotiation

Several coordinated APIs may be needed to request «services»
For set of coordinated APIs, we also need «choreography»

Coordinated APIs need a session concept



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ISO 28005 is transport independent, but includes HTTPS as standard

Choreography	ISO 28005 Message Implementation Guide (MIG)			
Message + Data	ISO 28005-1 multi-part message			
Message transport layer (OSI 1-7)	ISO 28005 HTTPS	eMail SMTP	eDelivery AS4	Nautical SECOM

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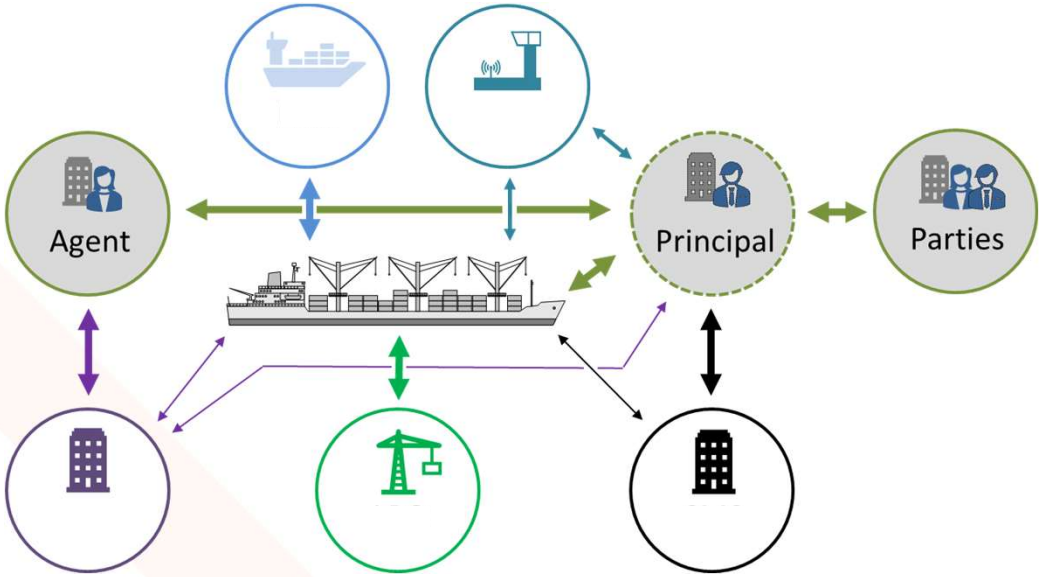
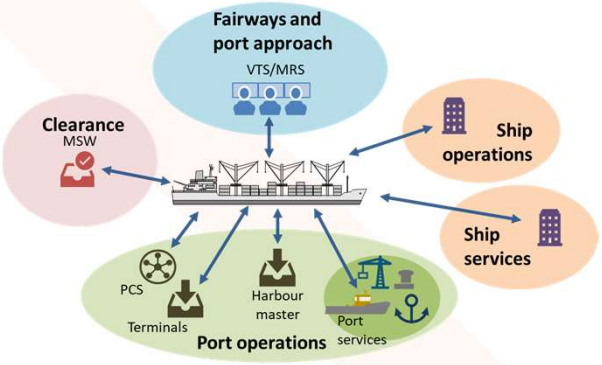
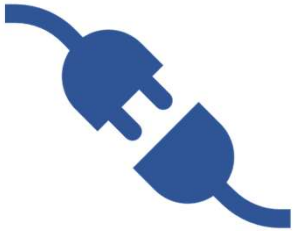
ISO 28005 is transport independent, but includes HTTPS as standard



Also useful if ship uses shore based principal (owner, manager or charterer) to communicate with other parties.

ISO 28005 is a peer-to-peer API access point specification





Ship-centric ship-shore operational and administrative communication.

Technical specification enabling consistent development of APIs for peer-to-peer communication.

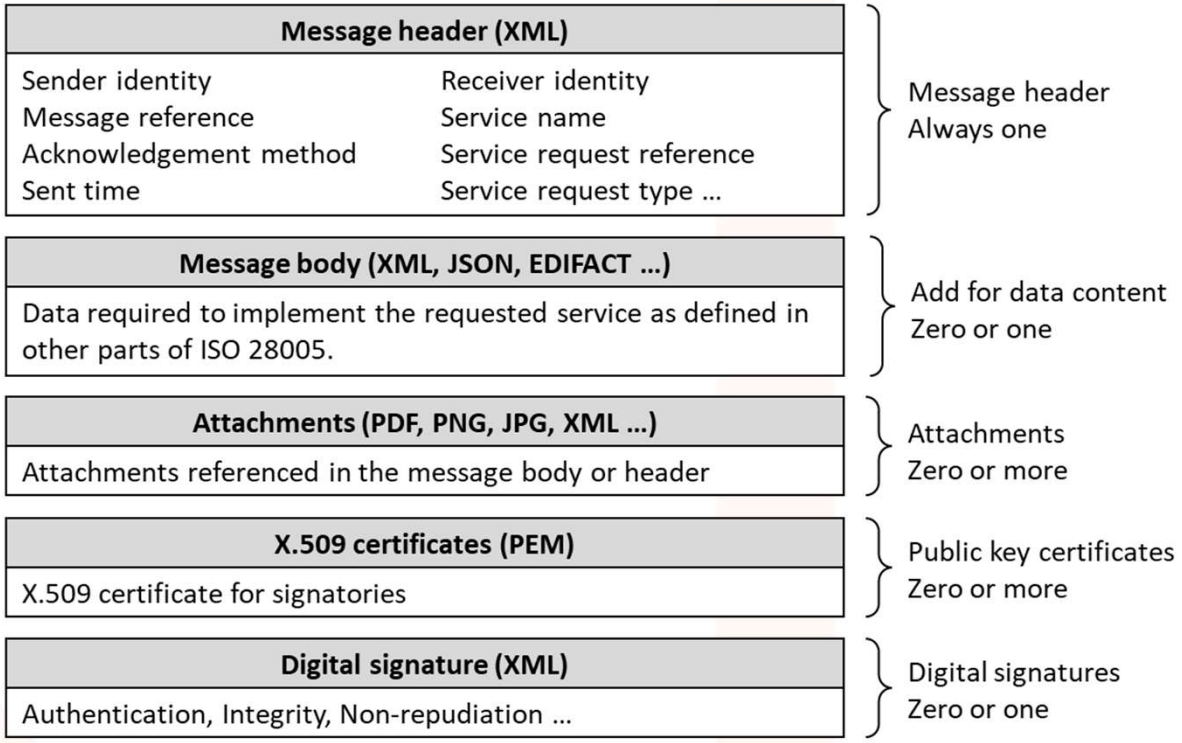
No public key infrastructure, no service discovery, no user registry. This can be implemented as a service.

Flexible multi-part message structure

Message header:
Connection management and for determining service. Always XML.

Message body:
API specific data content. May also be in other formats than XML.

Attachments:
Data sheets, photos, encrypted content etc. Any format.



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Flexible multi-part message structure

```
Content-Type: multipart/form-data; boundary="r4nd0m"
Content-Encoding: gzip

Prose text: This is an electronic message in the ISO 28005-1 format.
The attachments contain the different parts of the message.

--r4nd0m
Content-Type: application/xml; charset=utf-8
Content-Disposition: form-data; name=header;

[XML header goes here]
--r4nd0m
Content-Type: application/xml; charset=utf-8
Content-Disposition: form-data; name=body;

[XML body goes here - zero or one of this block]
--r4nd0m
Content-Type: application/pdf
Content-Disposition: form-data; name=attach1; filename=file1.xxx;

[attachment data goes here - zero or more of these blocks]
--r4nd0m
Content-Type: application/pkix-cert;
Content-Disposition: form-data; name=cert1; filename=cert1.cer;

[A DER encoded X.509 certificate goes here - zero or more]
--r4nd0m
Content-Type: application/xml; charset=utf-8
Content-Disposition: form-data; name=signature;

[XML signature goes here - zero or one of this block]
--r4nd0m--
```

Multipart/form-data:
Standard HTTP construct for messages with more than one part, possibly in different formats.

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Message header

Sender information (from sender)

- Sender and ship identity, request reply method, authorization code

Receiver information (from receiver)

- System identity (MSW, PCS, etc.), receiver identity

Message information (used by both)

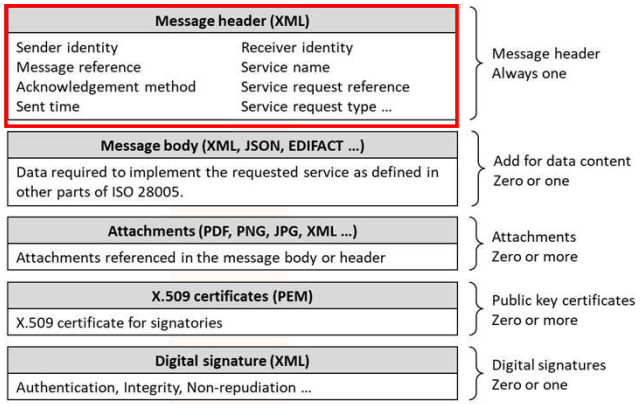
- Sent and created times, message reference codes, manifest and part types

Service request information (mainly from sender)

- Service description, reference codes, session context

Message and service status (from receiver)

- Status codes, missing data items, error message for humans



Message body

Standard XML format

- Contains all defined data objects as optional. API defines what elements should be used.

Option EDIFACT

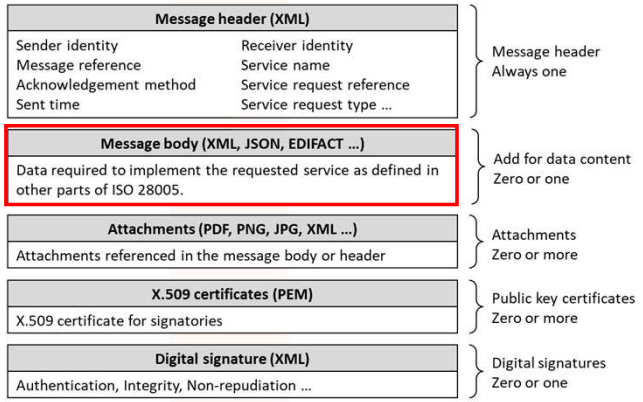
- Useful for complex cargo manifests and long passenger lists.

Option ISO 19848 (XML or JSON)

- Useful for technical data from ship (e.g. fuel consumption reports).

Option JSON

- Generic, no specific application has been defined.
- ISO 28005 message body XML format easy to translate to JSON if desired.



Message attachments

Data sheets for dangerous cargo

- Typical PDF-file, sometimes required.

Pictures

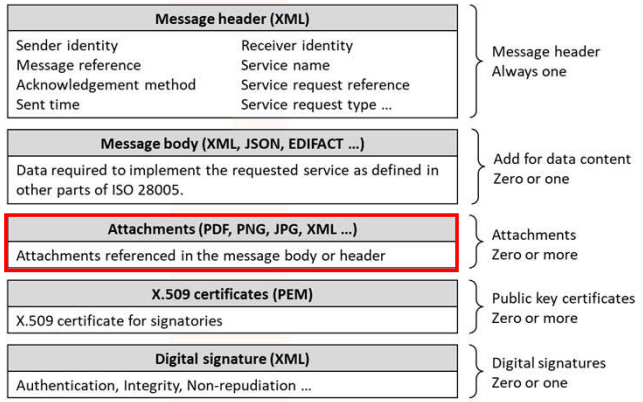
- Required, e.g. for stowaways.

Encrypted message body parts

- May be required for personal information when transmitted through 3rd party systems (PCS).
- Examples are passenger and crew lists, health declaration, stowaway reports.

Other formats

- May also contain, e.g. EDIFACT parts of a message body.



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Security

Use HTTPS to avoid eavesdropping.

Allow synchronous operation to allow only outgoing connections from ships.

Use digital signatures for authentication and message integrity.

Use acknowledgements and digital signatures for non-repudiation.

Implementation

Not using REST

- HTTP layer is not integrated in ISO 28005 processing.
- Can use off-the-shelf HTTP-libraries.
- Easy to use other data transport layers.

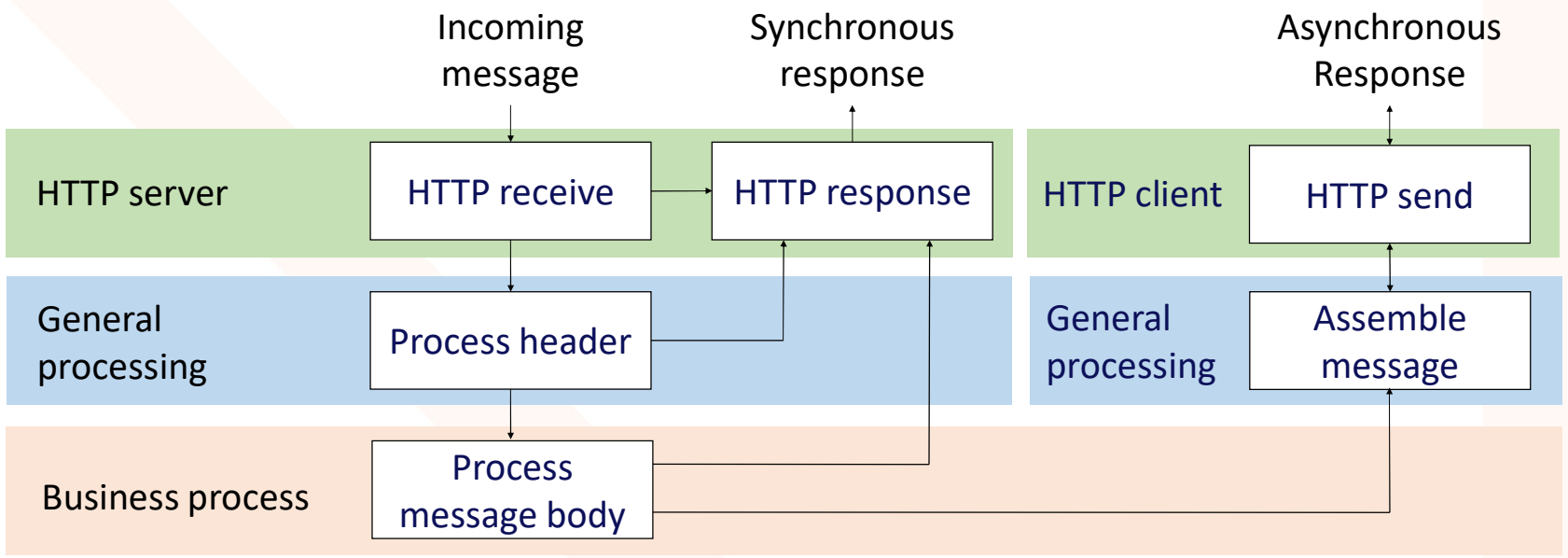
Standard HTTP and XML constructs

- Good availability of libraries and tools.

Allows simplified processing

- Do not need to implement complex API choreography if not needed.
- Allowed to define minimum data sets for body and header.

ISO 28005 enables a modular software structure



Apache™ or similar

Transport layer interface

Application software

Thank you for your attention!

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