



CHES Replacement Project

**Connectivity & Integration
Working Group
AMQP Integration**

31 October 2018

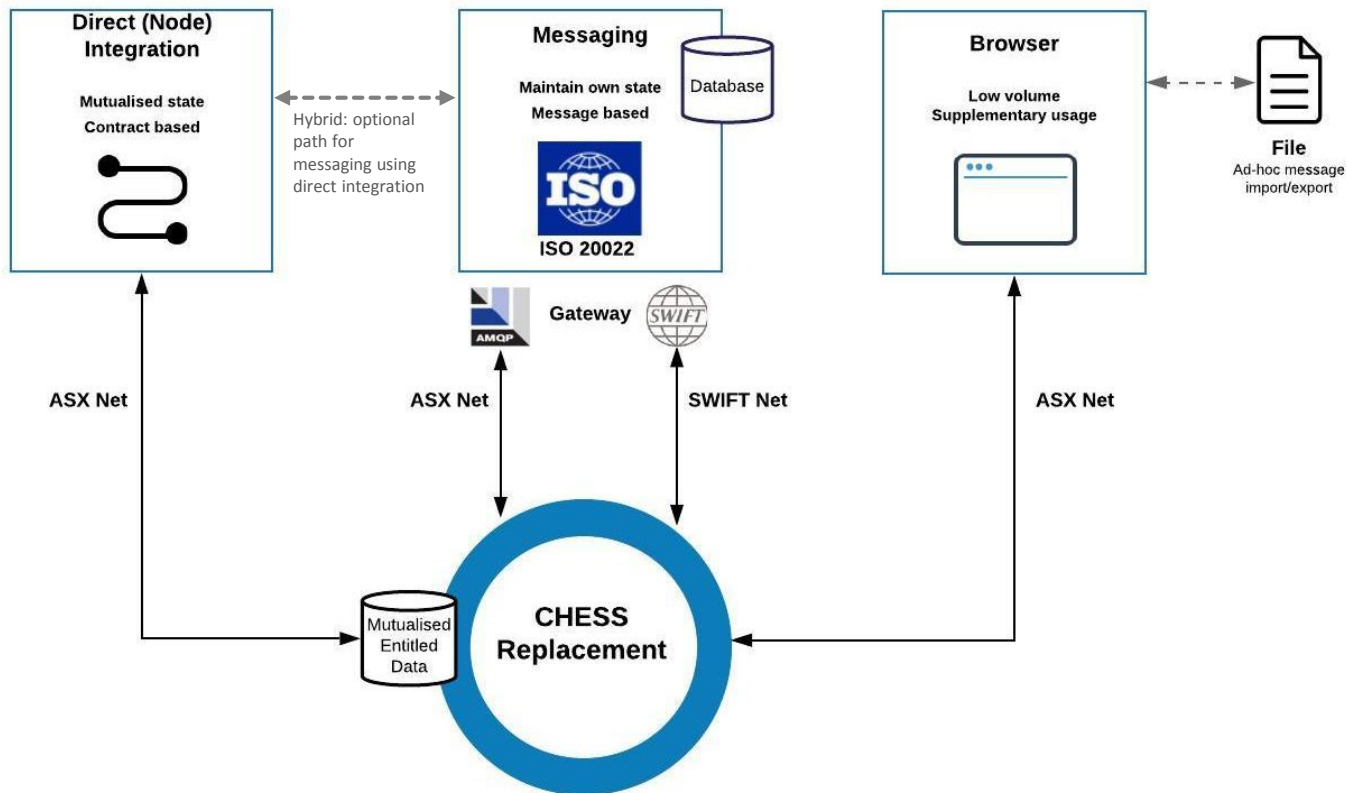
Important Information – Competition Law Policy

Working group members are reminded to have regard to their obligations under competition law. In particular, please note recent changes to the Competition and Consumer Act to prohibit a corporation from engaging with one or more persons in a concerted practice that has the purpose, effect or likely effect of substantially lessening competition.

Agenda

- > Introduction
- > AMQP v1.0
- > AMQP in CHES Replacement
- > ISO 20022 XML Message Overview
- > ASX's AMQP User Experience Demonstration
- > Programming Guide
- > Questions

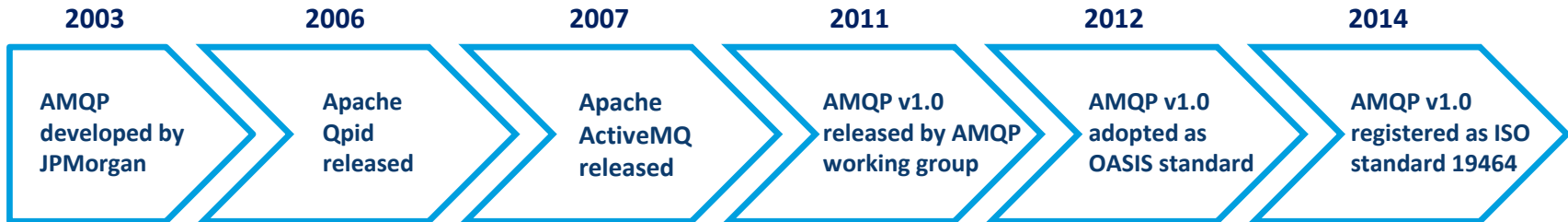
Connectivity Options



AMQP v1.0

AMQP Overview

- **AMQP – advanced message queuing protocol**
- **Application layer ‘wire-level’ protocol to move messages between applications**
- **AMQP is a specification, not a product**
- **v1.0 defines message protocol only, not broker architecture**
- **Not tied to a specific source or target topology**
- **Multi-language support including C++, Java, and Python**



AMQP Key Terms

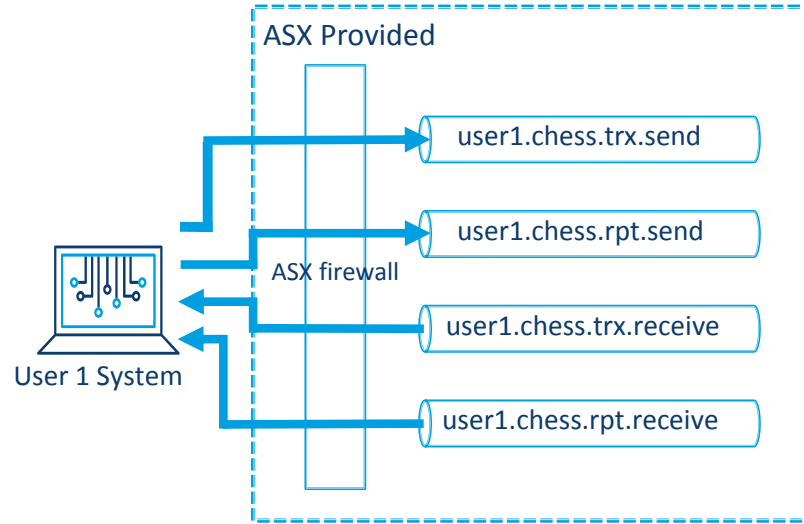
- **Connection** – network TCP connection to an AMQP server instance
- **Session** – bidirectional conversation between two devices
- **Producer** – user or system responsible for the creation of messages
- **Consumer** – user or system responsible for removing messages from a queue
- **Queue** – ordered collection of messages
 - **ASX Queue Properties:**
 - **Static** – created by broker based on predefined configurations
 - **Durable** – queue persists after broker restart
 - **First in, first out (FIFO)** – messages placed in the queue first will be consumed first
 - **ASX to define user message and business acknowledgment requirements**

AMQP in CHESS Replacement

CHESS Replacement AMQP Architecture

Features

- **Four dedicated, durable queues per customer**
- **ASX will define customer queue and endpoint naming convention**
- **Access to broker via ASX Net or internet VPN**
- **Connections secured with multifactor authentication, including TLS**
- **All ingress and egress messages in ISO 2002 XML format**



ASX AMQP Solution Features



Security

- All connections via ASX Net or internet VPN
- Multi-factor authentication



Queues

- User dedicated transaction and reporting queues
- Durable – persist even after user disconnection



Messages

- ISO 20022 XML format
- Signed by sender to guarantee authenticity and auditability



Reliability

- ASX-defined message acknowledgement procedure
- ASX will define message persistence within broker



Performance

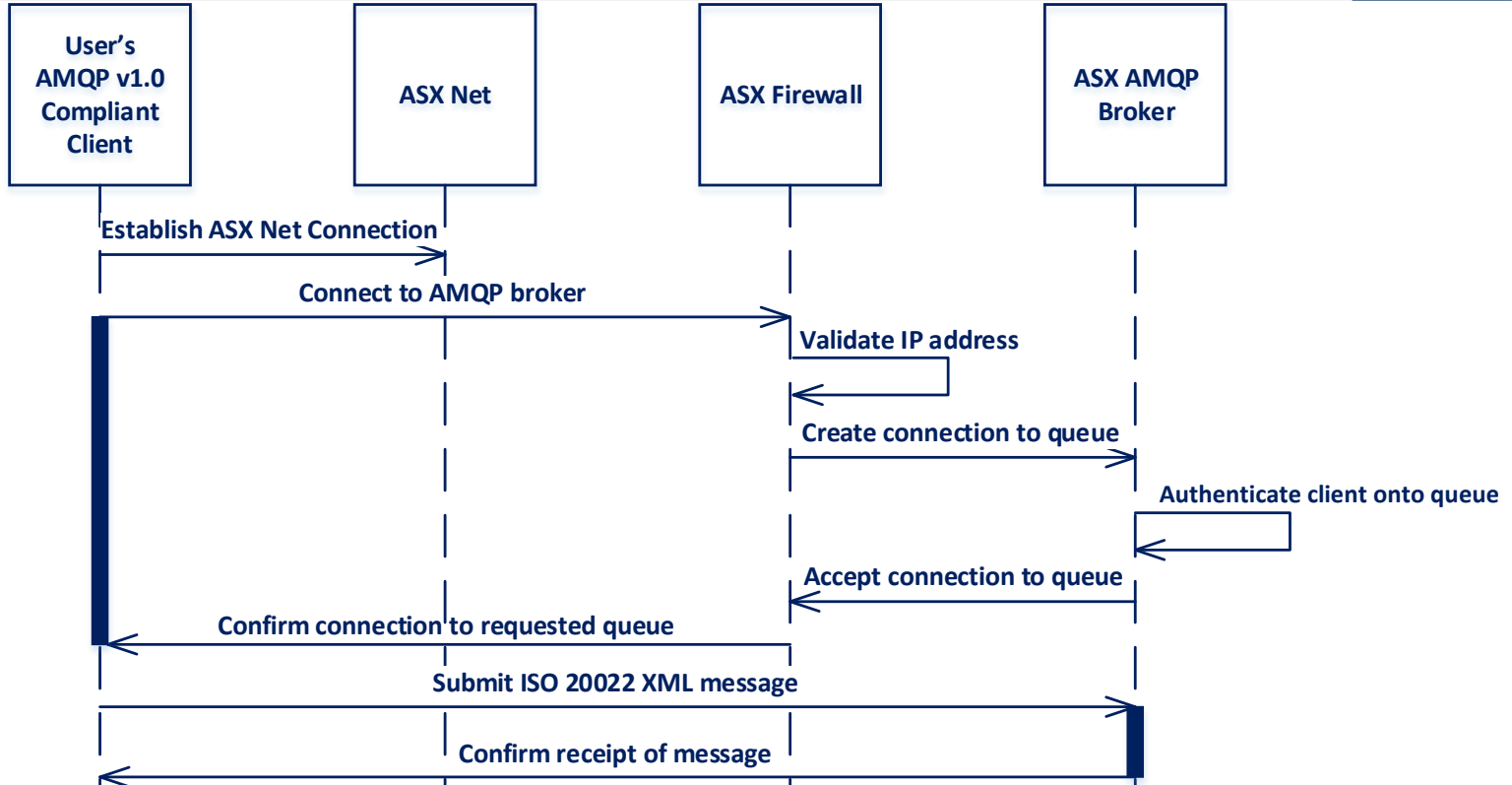
- Highly scalable solution
- Asynchronous message responses



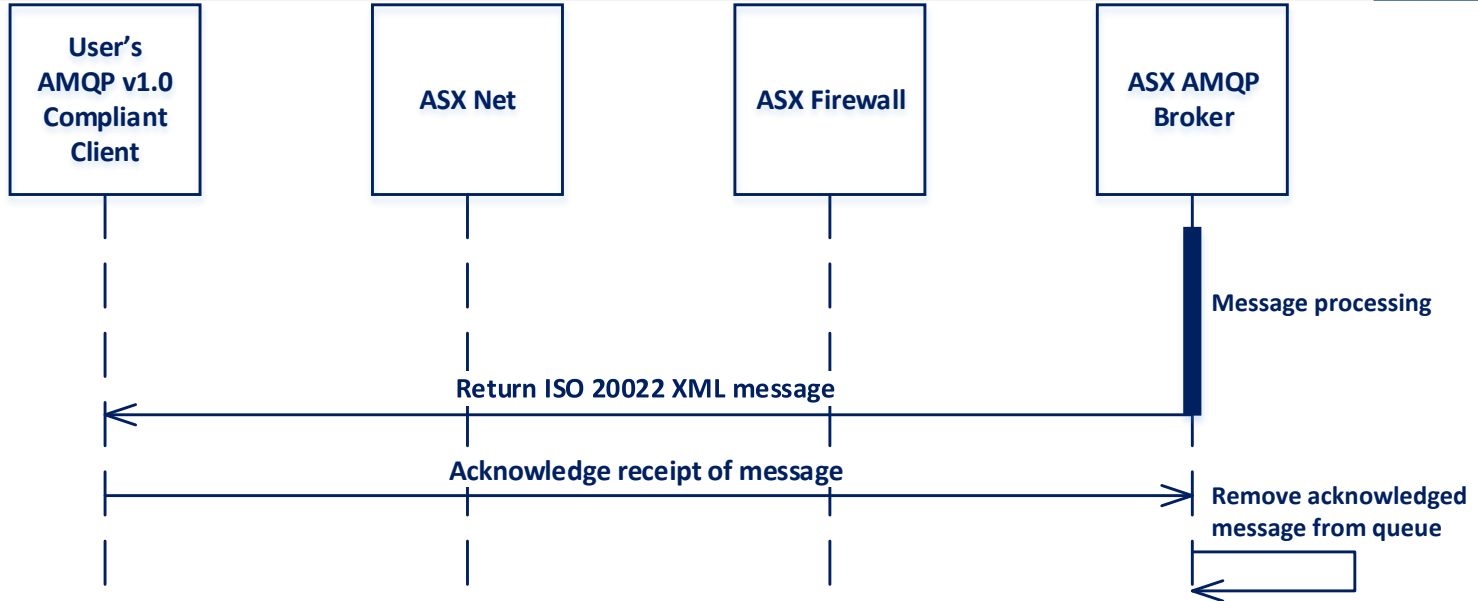
Availability

- High availability
- Failover and BCP will be covered in future sessions

AMQP Transaction Flow



AMQP Transaction Flow - Continued



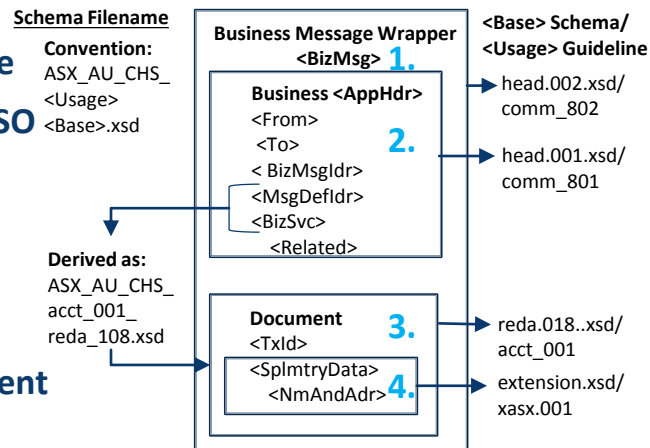
ISO 20022 XML Message Overview

Sample CHES Replacement Business Event

AMQP Account Creation using ISO 2002 XML

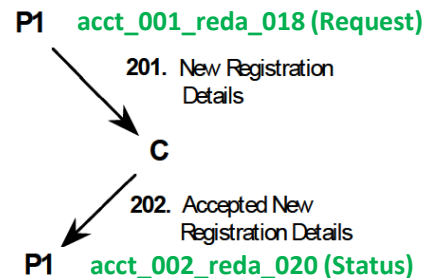
ISO 2002 in a nutshell

- 2-layer model with proprietary Transport and ISO 2002 Business Message
- Business Message consists of Business Application Header and choice of ISO document schemas
- Document Schema filename derived from BAH elements
e.g. <MsgDefldr>reda.018, <BizSvc>acct_001 (ignoring version)
- BAH/ISO Signature to be introduced in later CDE release
- For AMQP, ASX Business Message Wrapper encapsulates BAH and Document XML payload (InterAct header for SWIFTNet)



Business Events

- Market Practice in conjunction with CHES Replacement ISO 2002 Technical Committee
- Account Creation event using
acct.001 Securities Account Creation Request &
acct.002 Securities Account Status Advice



AMQP Input to CHES Replacement

- acct_001: Securities Account Creation Request

1. BizMsg

```
<BizMsg xmlns="urn:iso:std:iso:20022:tech:xsd:head.002.001.01"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation
="urn:iso:std:iso:20022:tech:xsd:head.002.001.01
ASX_AU_CHS_comm_802_001_01_head_002_001_01.xsd">
  <AppHdr>
    ...
  </AppHdr>
  <Document>
    <SctiesAcctCreReq>
      ...
      <SplmtryData>
        <Envlp>
          <Document>
            ...
          </Document>
        </Envlp>
      </SplmtryData>
    </SctiesAcctCreReq>
  </Document>
</BizMsg>
```

2.

3.

Party Identifier
to-be choice
of UIC and BIC

2. AppHdr

```
<AppHdr xmlns="urn:iso:std:iso:20022:tech:xsd:head.001.001.01"
xmlns:n1="http://www.w3.org/2000/09/xmldsig#"
xsi:schemaLocation="urn:iso:std:iso:20022:tech:xsd:head.001.001.01
ASX_AU_CHS_comm_801_001_01_head_001_001_01.xsd">
  <Fr>
    <Orgld><Id><Orgld><Othr>
      <Id>01403</Id>
    </Othr></Orgld></Id></Orgld>
  </Fr>
  <To>
    <Orgld><Id><Orgld><Othr>
      <Id>00001</Id>
    </Othr></Orgld></Id></Orgld>
  </To>
  <BizMsgldr>01403|AccountOCF533405|00</BizMsgldr>
  <MsgDefldr>DRAFT6reda.018.001.01</MsgDefldr>
  <BizSvc>acct_001_001_02_lp</BizSvc>
  <CreDt>2018-10-26T11-10-27.223Z</CreDt>
  <Sgntr>
    <n1:auto-generated_for_wildcard/>
  </Sgntr>
</AppHdr>
```

ISO Signature
to-be calculated
for Business Message

3. Document

```
<Document xmlns="urn:eurosystem:xsd:DRAFT6reda.018.001.01"
xsi:schemaLocation="urn:eurosystem:xsd:DRAFT6reda.018.001.01
ASX_AU_CHS_acct_001_001_02_reda_018_001_01.xsd">
  <SctiesAcctCreReq>
    <Msgld>
      <Id>00005|AccountOCF533405|00</Id>
    </Msgld>
    <SctiesAcct>
      <AcctOwnr>
        <RltdPtyld>XASXAU2S</RltdPtyld>
        <RspnsblPtyld>XASXAU2S</RspnsblPtyld>
      </AcctOwnr>
      <Id>NONREF</Id>
      <Tp>CSDP</Tp>...
    </SctiesAcct>
    <SplmtryData>
      <sup:Document
        xmlns:sup="urn:asx:xsd:asx.001.001.02"
        xsi:schemaLocation="urn:asx:xsd:asx.001.001.02|
ASX_AU_CHS_acct_001_001_02_reda_018_001_01_sup.xsd">
          <sup:NmAndAdr>
            <sup:Nm>Bayer Ltd</sup:Nm>
            <sup:Adr>
              <sup:AdrLine>51368 Leverkusen</sup:AdrLine>
              <sup:PstCd>700898</sup:PstCd>
              <sup:TwnNm>Berlin</sup:TwnNm>
              <sup:CtrySubDvsn>Berlin</sup:CtrySubDvsn>
              <sup:Ctry>DE</sup:Ctry>
            </sup:Adr></sup:NmAndAdr>...
          </sup:acct001SuplDataV01>
        </sup:Document>
      </SplmtryData>
    </SctiesAcctCreReq>
  </Document>
```

4. SupData

ASX's AMQP User Experience Demonstration

ASX's AMQP Journey

What were we hoping to gain?

- **User's perspective on interacting with the ASX using AMQP messaging**
- **Incrementally build ASX's knowledge of transacting via AMQP**
- **Allow ASX to more accurately target implementation trouble areas**
- **Allow ASX to better tailor technical documentation**

Our customer experience demo includes

- **AMQP client code configuration**
- **Submitting an ISO 20022 XML acct_001 securities account creation request**
- **Returning an ISO 20022 XML acct_002 securities account status advice**
- **Placing acct_002 status advice in a user defined file location**

AMQP User Demo

AMQP Programming Guide

Connecting to ASX using AMQP

What you need

- AMQP v1.0 compliant client
 - Download from: <https://qpid.apache.org/download.html> or <http://activemq.apache.org/download.html>
- ASX Net or internet VPN connection
- Configure your client
- Ability to create and sign ISO 20022 XML messages

Getting started with AMQP

- Apache Qpid - <https://qpid.apache.org/documentation.html>
- Apache ActiveMQ - <http://activemq.apache.org/getting-started.html>

ASX will provide

- User connection endpoints
- User queue names
- User TLS certificate
- User names (CDE day 1)
- User API key and secrets (CDE post OAuth2 implementation)

AMQP Key Takeaways

- **ASX has selected AMQP v1.0, ISO 19464**
- **AMQP is a wire protocol specification, not a product**
- **AMQP clients supporting v1.0 available in multiple languages**
- **Messages will be in ISO 20022 XML format**
- **ASX will provide:**
 - **Separate reporting and transaction queues**
 - **Connection endpoint names**
 - **TLS certificates**
- **Technical documentation coming December 2018**

Questions

Thank you

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