



CHES Replacement Project

**Connectivity & Integration
Working Group
SWIFTNet**

Commercial in Confidence

13 November 2018

Important Information – Competition Law Policy

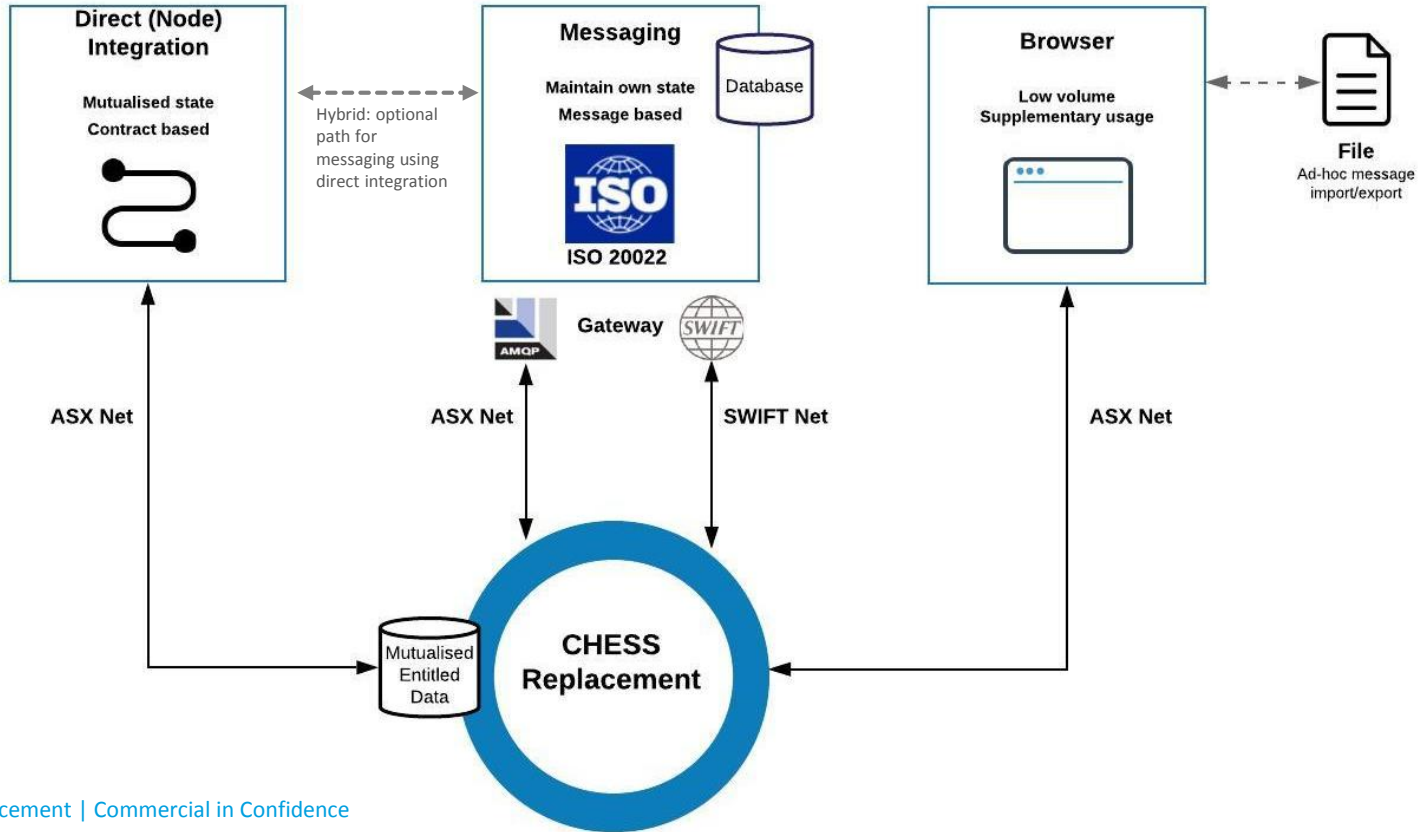
Working group members are reminded to have regard to their obligations under competition law.

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.

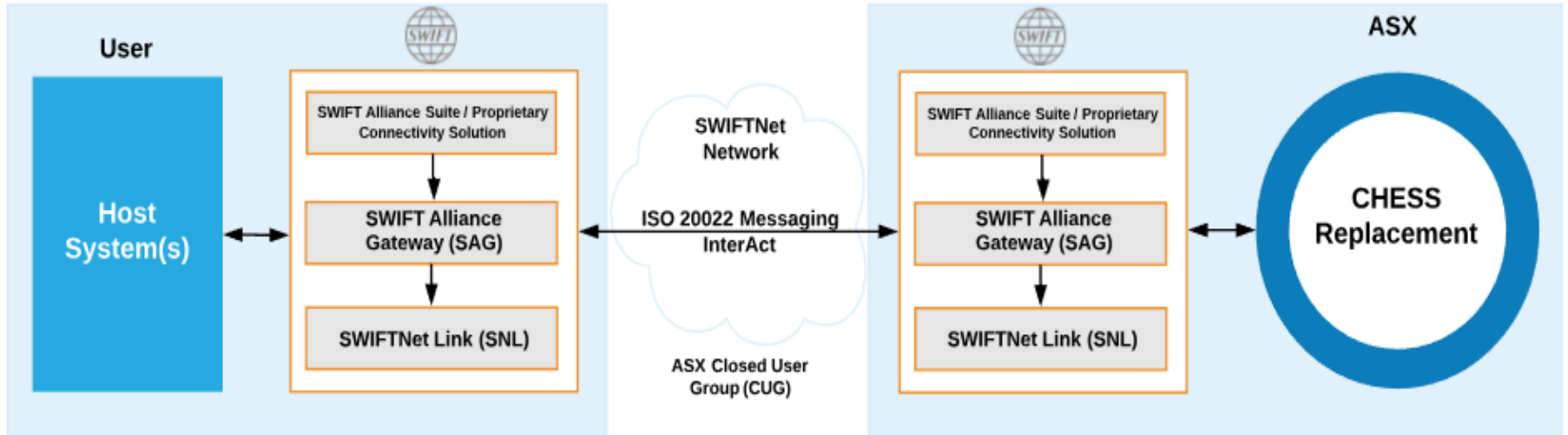
Agenda

- > Introduction
- > Overview of SWIFTNet messaging services
- > Overview of SWIFTNet user connectivity components
- > Transport of ISO 20022 Business Message
- > SWIFTNet connectivity to Customer Development Environment (CDE)
- > Complementary tools and resources
- > Timeline for CDE connectivity
- > Questions

Introduction: Connectivity Options



Introduction: SWIFTNet connectivity





Overview of SWIFTNet messaging services

13th November 2018

SWIFT membership

To use SWIFTNet services, an organisation must be a registered SWIFT user and have a Live BIC.

There are three primary options:

- a) Reuse an existing Live BIC
- b) Existing users can register for a new BIC or an additional BIC
- c) A organisation which is not currently a SWIFT user must first register and then apply for a Live BIC



Main messaging services

Message exchange

Secure and reliable messaging of formatted data, supporting ISO15022 or ISO20022.

InterAct

FIN

MI Channel

File Transfer

Exchange of data that comes in bulk (e.g. instructions, reports, statements)
Transfer of any format (e.g. images, pdf document ...)

FileAct

GUI

User-to-Application Browsing offers a lightweight and secure access.
Mainly used by Market Infrastructures to expose web applications to their participants

WebAccess

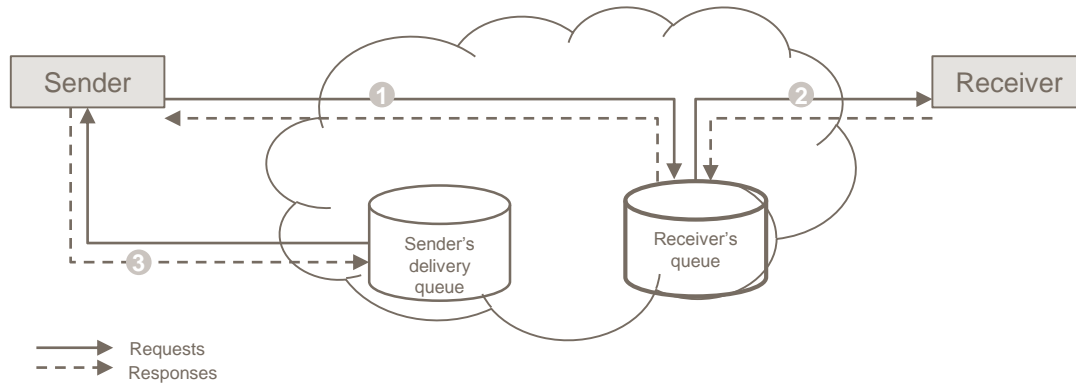
APIs

SWIFT central APIs either for public or private consumption.

APIs



InterAct Store & Forward mode



Key characteristics

- **Non-concurrent:** sender & receiver do not need to be connected simultaneously and messages are queued up to 14 days
- **Asynchronous:** sender can send multiple requests in parallel without waiting for a response
- **Load balancing & prioritization:** receiver can setup multiple queues with specific priority for each, and balance traffic over multiple queues

Process

- a) Sender sends message.
b) Message stored by SWIFT in receiver's SnF queue.
c) Sender receives ACK from SWIFT upon successful storage

- d) When receiver opens SnF queue, SWIFT delivers the message
e) Receiver sends User ACK to confirm delivery
f) SWIFT removes the message from the queue, providing access to the next message

- g) Optionally, SWIFT creates a delivery notification for the sender, and sends it to a SnF queue defined by the sender.

SWIFTNet technical features



Community

Closed User Group & RMA: Select your counterparties, avoid unsolicited traffic.



Message Contents

Validation: (MVAL) Syntax validation, allows lower exception rates and interoperability for the participants



Disputes

Non-Repudiation: The customer can ask SWIFT to re-verify a message signature, to prove its origin.



Operational Efficiency

Store & Forward: the sender and the receiver can operate independently



Recovery

Retrieval: Lost messages can be retrieved for 124 days, for example in case of interface failure; bulk retrieval for preceding 24 hours



Resiliency

99.999% Availability: 3 fully redundant operating centres, 24x7 support



Access Control

Role-based access control: allows participants to control who in their institution can access the application.



Delivery Monitoring

Delivery Notification and non-delivery warning: Confirmation when the message is delivered to the receiver



Reporting

Reporting: Queue Status Report, session history report, undelivered message report



Security

3 Levels: SNL, VPN, PKI

SWIFTNet Correspondent Names (Addressing)

The **Correspondent Names (Addressing)** are names that uniquely identify the senders and receivers of messages. They are used in the From: and To: fields of a message header, in the same way as for e-mail messages, but on SWIFTNet they are called the **Requestor and Responder DN**. They typically identify entities that are addressable, and therefore visible, to correspondents, such as branches, geographical locations, departments or business and functional units.

For FIN (MT) message address is based on BIC8 or BIC11

Example:

```
{1:F01BANKBEBBXXXX0000000000}{2:I103BANKAU2SXXXX}{3:{108:bankRef1}}{4:
:20:bankRef1
:23B:CRED
:32A:181028EUR10000,
:33B:EUR10000,
:50K:/1234326789
Jane DOE
Avenue Adele 1 B-1310 BE
:59:/987654321
David Fergie
24 Bridge Street
Sydney
Australia
:71A:SHA
```

For InterAct / FileAct message address is based on Requestor DN and Responder DN

Example :

```
<?xml version="1.0" encoding="utf-8"?>
<IsExchangeRequest>
<Envelop>
  <Basic>
    <TransactionRef>REF10610311505</TransactionRef>
    <SWIFTRef>swri00D03-2018-10-20T06:50:10.145874.137554Z</swiftRef>
    <Requestor>cn=enctest,o=bankbebb,o=swift</Requestor>
    <Responder>cn=enctest,ou=o=bankau2s,o=swift</Responder>
    <Service>swift.eni!p</Service>
    <MsgId>20dd2b9c-769d-4cB6-9f15-aa25f0aef</MsgId>
    <RequestRef/>
    <RequestType>
    <RdIndication>FALSE<PdIndication>
  </Basic>
</Envelop>
<Payload><AppHdr xmlns="urn:iso:std:iso:20022:text:xsd:head:001.001.01"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="BusinessApp1
  ..
</Payload>
```



Distinguished Names (DN)

Level 1: Registration Authority (RA)

- top of naming tree, RA SWIFT is identified to guarantee uniqueness of SWIFTNet names

Level 2: Organisation (o)

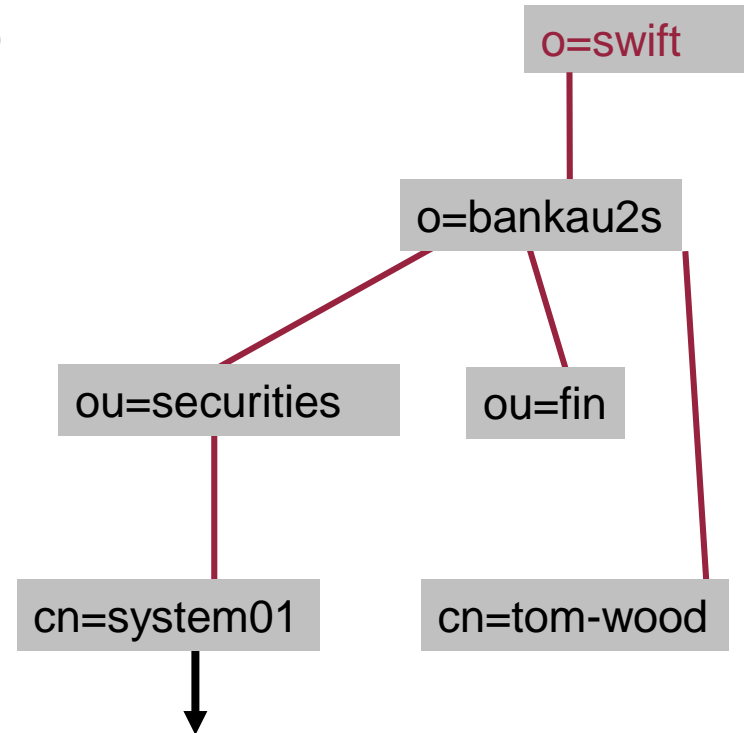
- registered by RA for institution
- name is always the BIC

Level 3: Organisational unit (ou)

- used by institution to register operational entities by service, location or by other criteria

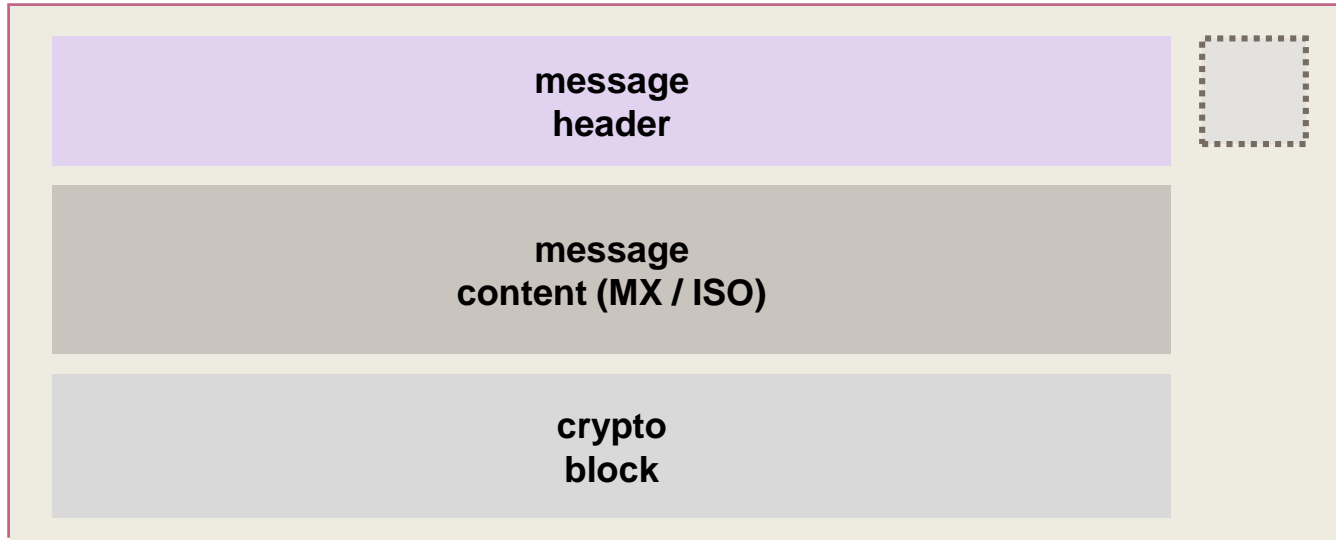
Level 4: Common name (cn)

- identifies operational entities like operators and applications



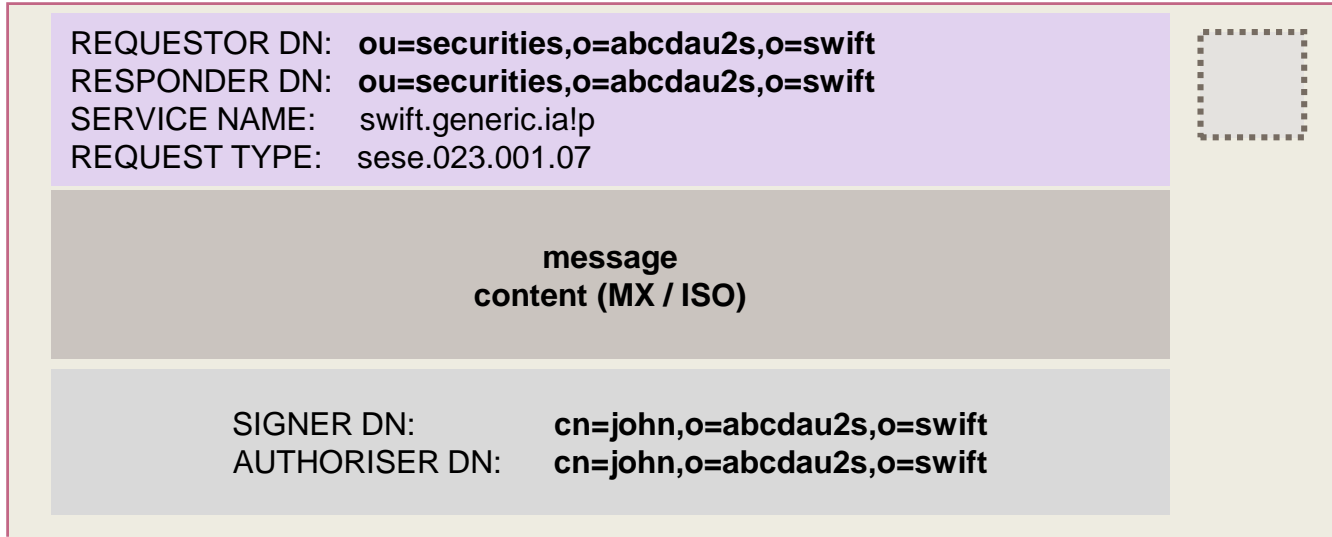
DN displayed format: cn=system01,ou=securities,o=bankau2s,o=swift

SWIFTNet message structure



- The message header is used for addressing (identification of correspondents) and routing (transport)
- The crypto block is used for security (integrity, confidentiality and access control) and contains certificate names

SWIFTNet message Distinguished Names



- Requestor DN identifies the sender of the message
- Responder DN identifies the receiver of the message
- Signer DN identifies who is responsible for the message content (end-to-end message authentication and integrity)
- Authoriser DN identifies who is responsible for sending the message (end-to-SWIFT, to control access to SWIFTNet)

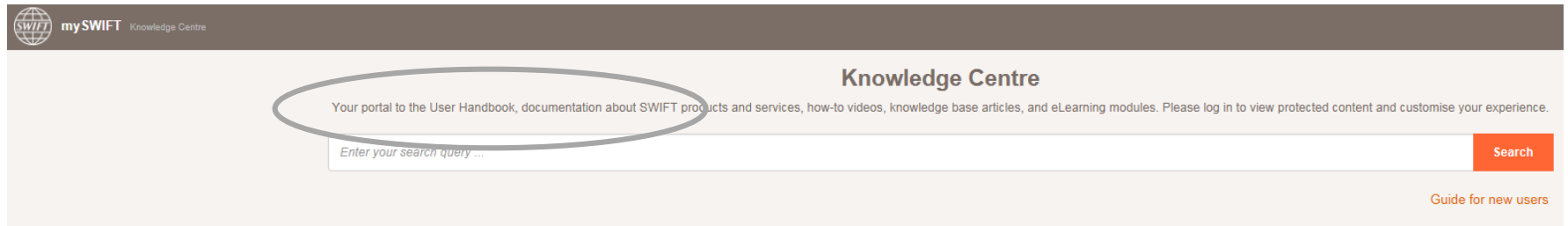
InterAct reference documentation

User Handbook:

- SWIFTNet Service Description -> InterAct section
- SWIFTNet Message Operations Guide -> InterAct section

All documentations are available in this link (SWIFT.com registered user login is required):

<https://www2.swift.com/knowledgecentre/productcategory>



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Product category

Products A-Z

Interests

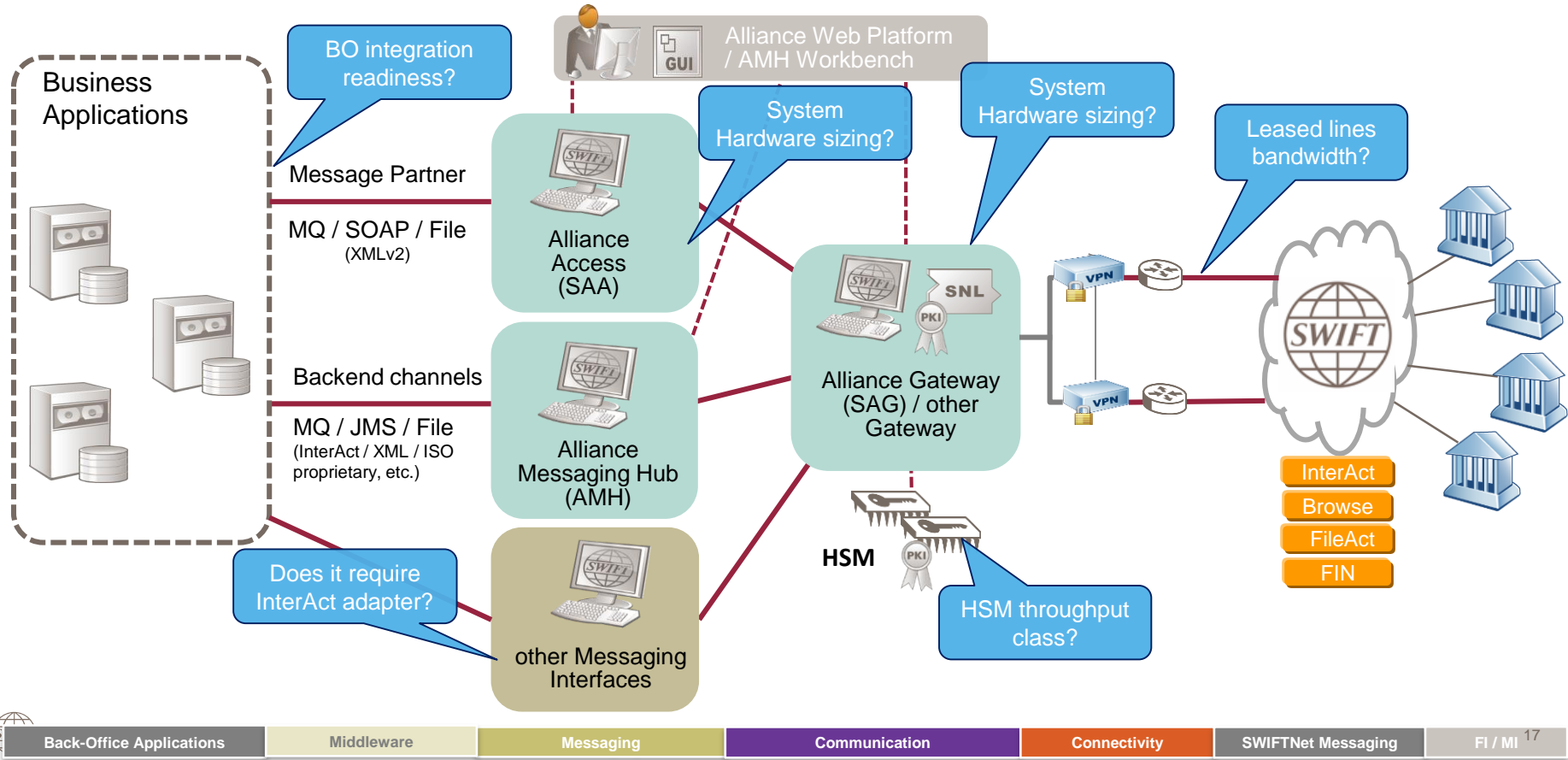




Overview of SWIFTNet user connectivity components

13th November 2018

SWIFT infrastructure components and technical considerations - overview



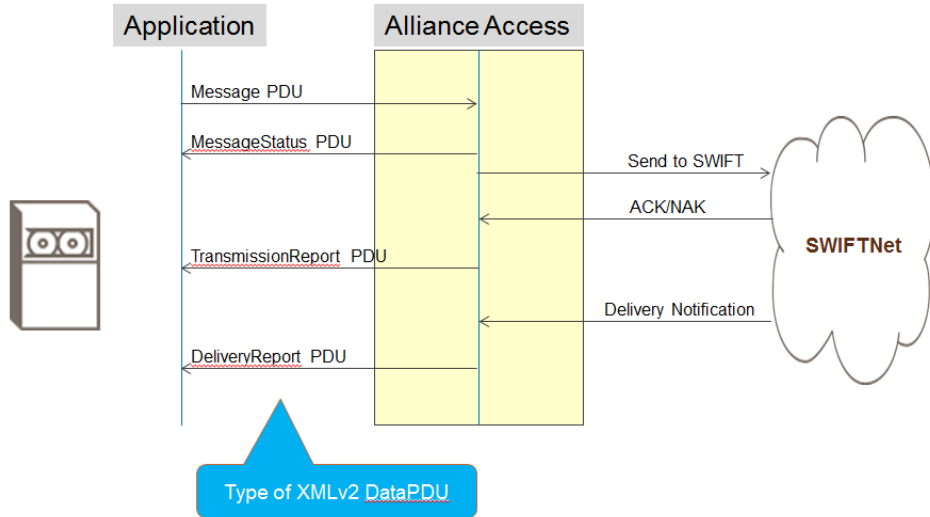
Integration and transformation requirements

For SAA:

- XMLv2 wrapper



XMLv2 protocol



- Location of the XML v2 schema can be found in SAA system under this folder /MXS/xsd/SAA_XML_v2.xsd
- Sample message also available in Windows (FIN and InterAct): %ALLIANCE%\MXS\batch_examples\Samples_v2_rev1.zip
- In UNIX (FIN and InterAct): \$ALLIANCE/MXS/batch_examples/Samples_v2_rev1.tar.Z
- For more details, please refer to Developer Toolkit for Alliance Access 7.x.x > (Developer Guide)



Integration and transformation requirements

For AMH:

- Full InterAct message
- ISO 20022, XML, AMP and other proprietary message format with message transformation is also possible.

How to configure AMH to connect to InterAct services?

> FileAct/InterAct Connectivity Guide – Alliance Messaging Hub 3.x.x

For other messaging interfaces:

- Please check with your SWIFT interface provider or in-house developers for InterAct integration requirements.

Where to find the list of SWIFT Certified Interfaces on www.swift.com?

<https://www.swift.com/about-us/partner-programme/swift-certified-interface-programme/document-centre>



SWIFT customer test environment

Distinguishing pilot and live traffic

- Customers must clearly distinguish traffic as being pilot or live, by using the correct naming conventions that allow to differentiate between them. This applies to concepts like service names, queue names, input channel names, and output channel names. Typically, these end in "**p**" for pilot traffic, while for live traffic there is **no** "**p**" at the end of the name.
- e.g. Service Name: swift.generic.ia!p for pilot (Test and Training)

Note : the service names (pilot and live) for CHES services will be confirmed by ASX.

Subscription to messaging services

- Customers must subscribe to the appropriate messaging services through the SWIFT service e-ordering website:

<https://www.swift.com/myswift/ordering/order-products-services/market-infrastructure>

- Only SWIFT users can use messaging services in the production environment for pilot (Test and Training) or live operations.

Note: the service subscription availability for CHES pilot service will be confirmed by ASX.



ISO 20022 XML Schema for CHES (E.g. Message Standards Deployment Package for Alliance Access)

Deployment package (also called MX Message Standard) is specific to Alliance Access and Alliance Webplatform software. Its purpose is to enable:

	Alliance Access	Alliance Webplatform	Alliance Messaging Hub
If MX Message Standard is available (DP has been installed)	<ul style="list-style-type: none"> - MP = "MX" format - Keyword extraction - "well-formed XML" validation 	<ul style="list-style-type: none"> - "structured" display - Creation/modification of MX messages - Use of MX template - XML schema validation 	<ul style="list-style-type: none"> - DP not required - XML schema
If MX Message Standard is NOT available (DP not installed)	<ul style="list-style-type: none"> - MP = "AnyXML" format - "well-formed XML" validation 	<ul style="list-style-type: none"> - "fast mode" display (as plain text) - creation of new messages not possible (only modification of existing messages) - No XML schema validation - "well-formed" XML validation 	



www.swift.com

Transport of ISO 20022 Business Message

Transport of ISO 20022 Business Message

BAH and Document within InterAct Header <Payload>

2-layer model for transport header and ISO 20022 Business Message

> Business Message consists of:

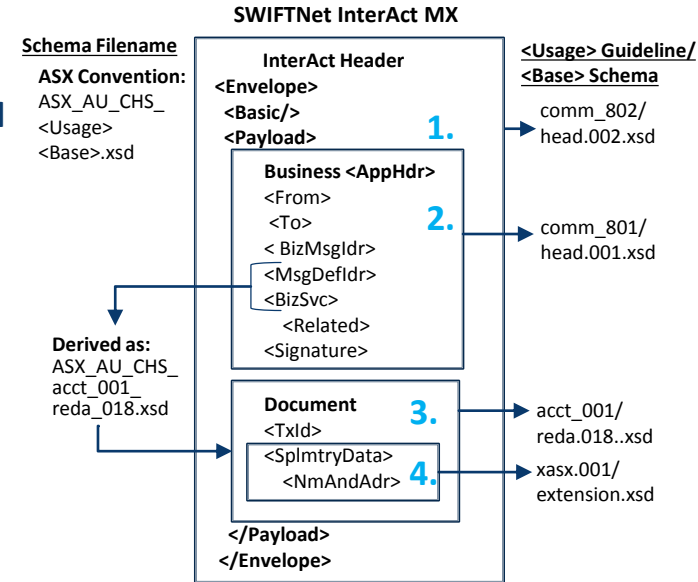
- Business Application Header (BAH) and
- choice of ISO Document schema

> InterAct header <payload> encapsulates BAH xml and Document xml

- Business Application Header
 - Mandatory for securities domain.
 - Not used in ISO 20022 payments including NPP
 - Choice of Party Identifier format in <To> and <From>. SWIFT BIC or ASX UIC. Independent of DN level 2 BIC.

> Linking BAH and Document

- Document schema filename derived from BAH element values e.g. & <BizSvc>acct_001 & <MsgDefIdr>reda.018 (ignoring version)



CDE Drop1 set-up

- > Only ASX Party Identifier initially. Connected SWIFT BIC must be used in InterAct DN's
- > BAH/ISO Signature mandatory with calculation to be introduced in later CDE drop.
 - Detailed in 1st tranche of technical documentation

SWIFTNet Input to CHES Replacement

- acct_001: Securities Account Creation Request

1. InterAct Header

```

<Envelope>
  <Basic>
    <TransactionRef>TINA201807200654102813</TransactionRef>
    <SwiftRef>swi00003-2018-07-20T06:54:10.14874.137554Z</SwiftRef>
    <Requestor>ou=corpact,o=xasxau2s,o=swift</Requestor>
    <Responder>cn=emc,ou=na,o=abcdau3x,o=swift</Responder>
    <Service>xasx.ca.sflp</Service>
    <Msgld>20dd2b9c-769d-4c86-9f15-aa25f0a9faef</Msgld>
    <RequestRef/>
    <RequestType>seev.031.002.04</RequestType>
    <PdIndication>FALSE</PdIndication>
  </Basic>
</Envelope>
<Payload>
  <AppHdr>
    ...
  </AppHdr>
  <Document>
    ...
  </Document>
</Payload>

```

Party Identifier
to-be choice
of UIC and BIC

2.

3.

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>
      <AcctOwnt>
        <RltdPtyld>XASXAU2S</RltdPtyld>
        <RspnsblPtyld>XASXAU2S</RspnsblPtyld>
      </AcctOwnt>
      <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:Document>
        </sup:Document>
      </SplmtryData>
    </SctiesAcctCreReq>
  </Document>

```

4. SupData



SWIFTNet connectivity to Customer Development Environment (CDE)

SWIFTNet ISO 20022 messaging

CDE using !pilot Closed User Group (CUG)

InterAct header <Basic> parameters

- > <Requestor> (Sender) and <Responder> (Receiver) using Distinguished Names
 - Minimum 2 levels
 - 3rd recommend to distinguish from ASX CorpAction service
 - Level 2 organisation=BIC
 - Level 3 org.unit for “CHES Replacement” <servicename>
 - ASX DN “ou=<servicename>, o=xasxau2s, o=swift”
 - Party DN “ou=<servicename>, o=<yourBIC>, o=swift”
 - Signing, Authorising DNs To be confirmed
 - Further levels as required for internal routing by Receiver
- > Technical <Service> e.g. xasx.ca.sf!p (for ASX CorpAction service)

```
<Envelope>
  <Basic>
    <TransactionRef>TINA201807200654102813</TransactionRef>
    <SwiftRef>swi00003-2018-07-20T06:54:10.14874.137554Z</SwiftRef>
    <Requestor>ou=corpact,o=xasxau2s,o=swift</Requestor>
    <Responder>cn=emc.ou=na.o=abcdau3x.o=swift</Responder>
    <Service>xasx.ca.sf!p</Service>
    <MsgId>20dd2b9c-769d-4c86-9f15-aa25f0a9faef</MsgId>
    <RequestRef>
    <RequestType>seev.031.002.04</RequestType>
    <PdIndication>FALSE</PdIndication>
  </Basic>
</Envelope>
<Payload>
  <AppHdr>
    ...
  </AppHdr>
  <Document>
    ...
  </Document>
</Payload>
```

SWIFTNet ISO 2002 messaging

CDE using !pilot Closed User Group (CUG)

SWIFT member connectivity

- > 'Hub and spoke' messaging between Party & ASX as Market Infrastructure
 - No direct messaging between parties

CDE testing in !pilot Closed User Group.

- > 'Test & Training' production service
 - segregated from 'Live' production by !p <Service>
 - Live or Test BIC used as part of Distinguished Name
 - Must be Institution BIC (8). Not Branch BIC (11) format.
- > **CUG subscription by request via swift.com from Q1, '19.**
- > **Store & Forward Parameters**

- SWIFTNet Queue Name <YourBIC>_<Service>_sf_!p
- List of Requestor and Responder DNs ASX DN, Party DN
- Request Type [allows future messages] * (wildcard)

Indirect Vendor connectivity

- > **Only SWIFT members allowed !pilot CUG connectivity**
- > **Vendor SWIFTNet testing requires:**
 - collaboration with SWIFT members and use of their SWIFTNet infrastructure

Subscribe to a Market Infrastructure

A Market Infrastructure is a system administered by a public organisation or other public or a private and regulated association or entity, that provides services for trading, clearing and settlement, matching of financial transactions, and depository functions.

ASX OPERATIONS PTY LTD (BIC : XASXAU2S)	
ASX ReferencePoint Corporate Actions (Live)	Subscribe
ASX ReferencePoint Corporate Actions (Test)	Subscribe

ASX !p Service & CUG parameters

Service Level parameters	Value TBC
Business Service Name	ASX ... (Test)
Technical Service Name	xasx.chs.sf!p
Operating Environment	Pilot user
Billing Model	Under review
Role-based access control	No
Request Level parameters	Value TBC
Request Name	* (wildcard)
Messaging Service	InterAct
Mode	Store & Fwd
Non-repudiation	Yes, Mandatory
Direction	Admin ↔ Party

SWIFTNet ISO 20022 messaging (cont.)

!pilot CUG message integration

MX Message Validation

> Gateway and Network validation

- Basic gateway validation. Parameters including Responder addressing.
 - Guideline schemas can be exported and deployed to gateway validation (earlier nack)
 - Frequent packages requires co-ordination and forced upgrade to any later version
 - e.g. ASX's gateway using base schemas given external workflow and application validation
- Network validation against Standards Release 2018 base schemas. n/a for candidate ISO 200022 messages
- Delivery Status: Waiting, Network Ack/Nack, ASX not requesting Delivery Notifications

Message Responses

> Application validation of ISO 20022 xml

- against Guideline schema (Technical nack: comm_807)
- and business rule validations (Business nack: comm_808)

MX/ISO Transformation

> Lookup of BAH<From> and <To> Party Id to DN for <Requester> and <Responder>

Reminder: For Drop1 ... only "UIC" Party Identifier format supported in Business Message

Future CDE drop ... both BIC and UIC formats supported for Party Id and Counterparty Id

SWIFTNet ISO 20022 messaging (cont.)

Client Application calculation and transformation

> **Mandatory ISO signature for all ISO 20022 messaging channels**

- For SWIFTNet, ISO Signature in addition to SWIFTNet transport signature
- Separate ISO Public Key and certificates

> **ISO signature method to-be advised in 1st Technical Documentation**

- ISO signature calculated by <From> Party, verified by <To> Party – recommended
- Not calculated for CDE Drop1, attribute to satisfy mandatory element.

> **Counterparty Identifier lookup from “Counterparty Directory” containing UIC and any BIC values**

> **ISO message definitions include message pagination when SWIFTNet maximum message size exceeded**

- ASX will review overflow requirements and advise if there are any scenarios when applicable
- Would require handling of multiple business messages with page no. and last page indicator for a single logical message

SWIFTNet messaging option Features



Security

- Multi-factor authentication
- Hardware Security Modules
- Non-repudiation



Reuse

- Reuse of SWIFT infrastructure
- Leverage of existing application integration
- Interoperable between FIN/MT and InterAct/MX messages



Messages

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



Reliability

- Guaranteed Delivery
- SWIFT-defined acknowledgement protocol
- Gateway and Network Validation



Performance

- Scalable range of connectivity components
- Monitoring and workflow tools available



Availability

- High availability
- Resilience
- Virtual Private Network
- Leased Lines

Complementary tools and resources

Complementary tools and resources

Testing without CDE connectivity

Example Connectivity Readiness guide

- > ASX's Intraday Corporate Action STP also using ISO 20022 messages and !pilot Closed User Group
- > <https://www.asx.com.au/services/settlement/asx-settlement/corporate-actions-stp.htm>

SWIFT MyStandard Readiness Portal

- > Online tool for validation of CHES Replacement xml files
Meaningful explanations, links to MyStandards Usage Guidelines

• Schema validation using xml tools

- > xml schemas released with Technical documentation
- > .xsd exported from MyStandards. Also guideline .xls, sample .xml
- > Manually parse sample .xml against xsd to confirm technically valid
- > Create xml files in xml editor tool for test scenarios

MyStandards Readiness Portal

A discovery-based approach to understanding specific formats

1. Discover format issues

2. Easy to fix and re-test

The screenshot shows a web interface with error messages at the top: "ERROR [Error] This field must be maximum 20 characters long. The current value 'PVEED00019' is 35 characters long." Below the errors is a snippet of XML code. A yellow circle highlights the error messages, and a grey circle highlights the XML code.

A discovery-based approach to understanding specific formats

3. Direct link to Documentation

4. Contextual questions to support

The screenshot shows the same error messages as above. A purple arrow points from the error message to a table of field descriptions. A green circle highlights the table, and a green circle highlights the error message. A green circle highlights the text "Documentation is second line of support".

Field Name	Field Description
Group Identifier	Group Identifier
Message Identification	Message Identification
Transaction Date Time	Transaction Date Time
Administration	Administration
Number of Transactions	Number of Transactions
Order Book	Order Book
Initiating Party	Initiating Party
Executing Agent	Executing Agent
Financial Institution	Financial Institution
Proprietary Identifier Identification	Proprietary Identifier Identification
Transaction Reference	Transaction Reference
Entity Booking	Entity Booking
Number of Transactions	Number of Transactions
Order Book	Order Book

Source: ISO 20022 Technical Committee 31/7/2018 at <https://www.asx.com.au/services/iso20022-technical-committee.htm>

Timeline for CDE connectivity

Timeline for SWIFTNet CDE connectivity

!pilot CUG subscription & collaboration

CDE available from April '19

- > 1st Technical documentation in Dec '18
- > SWIFT provisioning !pilot CUG in Q1, 2019. ASX as administrator. SWIFT members as subscribers.
- > Process for nominating CDE connectivity including !pilot CUG parameters

Points for consideration

- > SWIFT Members
 - Identify BIC, Party Id, and Distinguished Name for CDE connectivity
 - Order !pilot CUG subscription on SWIFT.com & advise ASX. Allow 3-4 weeks for set-up.
 - Configure test SWIFTNet infrastructure for CDE connection
 - Confirm deliverability of test MX business messages from SWIFTNet infrastructure and Client Application
 - Plan for remediate &/or enhance SWIFTNet infrastructure
- > Vendors & SWIFT Members
 - Identify partners for collaborative CDE testing
 - Develop ISO 20022 business messages for Drop1 functional testing

Questions?

Thank you

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