



# CHES Replacement Technical Committee

8 November 2023



ASX acknowledges the  
Traditional Owners of  
Country throughout Australia.  
We pay our respects to  
Elders past and present.

ARTWORK BY: LEE ANNE HALL, MY COUNTRY MY PEOPLE





# Important information

## – Competition Law reminder

Committee members are reminded to have regard to their obligations under competition law. In particular, please note that the Competition and Consumer Act prohibits 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.

# Housekeeping: trouble shooting

- Please mute yourself when not speaking
- Please use the 'raise hand' feature on MS Teams if you would like to ask a question
- Please introduce yourself when talking for the benefit of all members
- Meeting is being recorded for the purposes of minute taking
- Dial in details (audio only):
  - [+61 2 7208 4607](tel:+61272084607)
  - [Phone Conference ID: 486 431 578#](tel:+61272084607486431578)
- Presentation materials were distributed before the meeting

# Welcome & agenda

# Agenda

8 November 2023

- 
- Welcome and Open Actions
- 
- Member feedback
- 
- Project status and governance
- 
- ISO 20022 Binary Transmission
- 
- Scope Refinement Next Steps & Engagement
- 
- Forward work plan
- 
- Observer playback
-

# Open Actions

# Open actions

## Captured from previous Technical Committees

Item number #	Action	Due date	Status	Owner
2023 September (2)	Investigate and make recommendations on how the Technical Committee can collaborate with the Equities Settlement Payments Providers Sub Committee (ESPPSC).	8 November 2023	Open - Addressed in 8 Nov TC	ASX
2023 September (3)	Clarify more detail on scope recommendations including next steps.	8 November 2023	Open - Addressed in 8 Nov TC	ASX
2023 September (5)	Investigate options for binary transmission of ISO 20022 for high volume Participants.	8 November 2023	Open - Addressed in 8 Nov TC	ASX
2023 September (6)	Contact <a href="#">ASX CHES Replacement</a> if SWIFT access pricing affected a Committee members' response to the interface options survey.	8 November 2023	Open - Addressed in 8 Nov TC	Committee Members
2023 September (7)	Ensure Business Committee representatives are informed of Committee recommendations before the 11 October BC.	11 October 2023	Open - Addressed in 8 Nov TC	Committee Members
2023 September (8)	Clarify the 'proceed to design' classification as part of the TC recommendation to BC (BC Paper).	11 October 2023	Open - Addressed in 8 Nov TC	ASX



# Member feedback

# AFMA Registries Forum

# Project Status & Governance



# Redesign plan update

## Plan for solution design

	CY Q1	CY Q2	CY Q3	CY Q4
<b>Product Definition &amp; Business Case</b>	<ul style="list-style-type: none"> <li>✓ Business Vision &amp; Strategy</li> <li>✓ Program Objectives</li> </ul>	<ul style="list-style-type: none"> <li>✓ Scope and business requirements refined</li> </ul>	<ul style="list-style-type: none"> <li>✓ Scope and business requirements baselined</li> </ul>	
<b>Solution Assessment</b>	<ul style="list-style-type: none"> <li>✓ Current state evaluation</li> <li>✓ Solution decision framework developed</li> </ul>	<ul style="list-style-type: none"> <li>✓ Solution decision framework approved</li> <li>✓ Solution options refinement</li> <li>✓ Solution options evaluated</li> </ul>	<ul style="list-style-type: none"> <li>✓ Solution design finalised</li> <li>✓ Project estimation completed</li> </ul>	<ul style="list-style-type: none"> <li>★ Targeted announcement of solution design</li> </ul>
<b>Sourcing &amp; Commercial</b>	<ul style="list-style-type: none"> <li>✓ Market Scan</li> <li>✓ Vendor solution RFI</li> </ul>	<ul style="list-style-type: none"> <li>✓ Vendor RFI evaluation</li> <li>✓ Vendor RFP issued and responses received</li> <li>✓ Solution integrator RFP</li> </ul>	<ul style="list-style-type: none"> <li>☐ Potential vendor selection processes</li> <li>☐ Potential SI selection processes</li> </ul>	<ul style="list-style-type: none"> <li>Market engagement on readiness and implementation planning</li> </ul>
<b>Testing &amp; Implementation</b>	<ul style="list-style-type: none"> <li>✓ Implementation options review</li> </ul>	<ul style="list-style-type: none"> <li>✓ Implementation impact assessment</li> <li>✓ High level test strategy</li> </ul>	<ul style="list-style-type: none"> <li>✓ Implementation strategy</li> <li>✓ Test strategy &amp; approach completed</li> </ul>	

**To note:**

- Decision to be made following consideration of Advisory Group's input

**Legend:**

- ☐ Inflight
- ✓ Completed



# ISO 20022 Binary Transmission

**Open Action: 2023 September (5)**

Investigate options for binary transmission of ISO 20022 for high volume Participants.

# ISO20022 Binary Transmission

2023 September (5) : Investigate options for binary transmission of ISO 20022 for high volume Participants.

## **Background**

- CHES Replacement is currently planning on using ISO 20022 with XML format messages. The use of ISO 20022 XML:
  - aligns with other global market infrastructures; and
  - leverages the work already carried out by both ASX and the market
- A participant was concerned with the use of the verbose ISO 20022 XML format at volume may result in a non-performant interfaces for large Participants and asked whether the ASX had explored binary formats for transmission of the data.
- ASN.1 encoded ISO 20022 messages are an alternative binary format to XML and are:
  - significantly faster to decode
  - significantly smaller than in XML
- The possible actions are:
  1. Continue with XML format (with optional removal of outbound message signatures)
  2. Switch to ASN.1
  3. Support ASN.1 in conjunction with XML

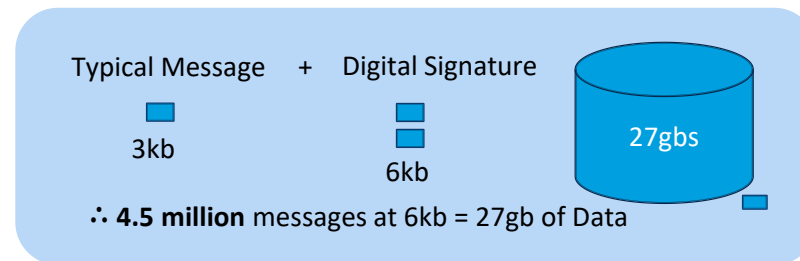


# ISO20022 Binary Transmission

2023 September (5) : Investigate options for binary transmission of ISO 20022 for high volume Participants.

## Context for Analysis

- The proposed message format in CHES Replacement is ISO 20022 XML
  - A typical message is 3Kb in size and swells to 6 KB with a digital signature .
  - Clearing Participants receive a notified trade message for each trade that is registered for clearing.
  - A large clearer on 15M trade day may receive ~4.5M messages (counterparty to 30% of the trades).
  - Modelling on the March 2020 peak indicates that a system wide throughput of <1500/s is needed to process all trades. A large clearer with 30% of the trade volume would need to handle 500/s<sup>‡</sup>.
  - Assuming a 6KB average size then the total data would be 4.5M x 6KB = 27GB of data.



# Decoding Performance

2023 September (5) : Investigate options for binary transmission of ISO 20022 for high volume Participants.

**OSS Nokalva "White paper on ASN 1 in ISO 20022" exploring the relative performance characteristics of XML vs ASN.1 for common ISO 20022 business areas.**

## Key insights -

- The ASN.1 format achieves very high rates of decoding well in excess of 100,000/s (and well in excess of the rates required by CHES Replacement).
- The paper does not provide tabular data of the results but notes that the ASN.1 results are circa 24-45 times higher than the basic XML format. Based on the chart, this still implies a rate in the thousands per second for XML.
- The basic XML format outperforms compressed XML formats, implying given sufficient bandwidth there is nothing to be gained from compressing the XML payload.

## Conclusion

- While ASN.1 is significantly faster than XML, XML is fast enough for CHES volumes.

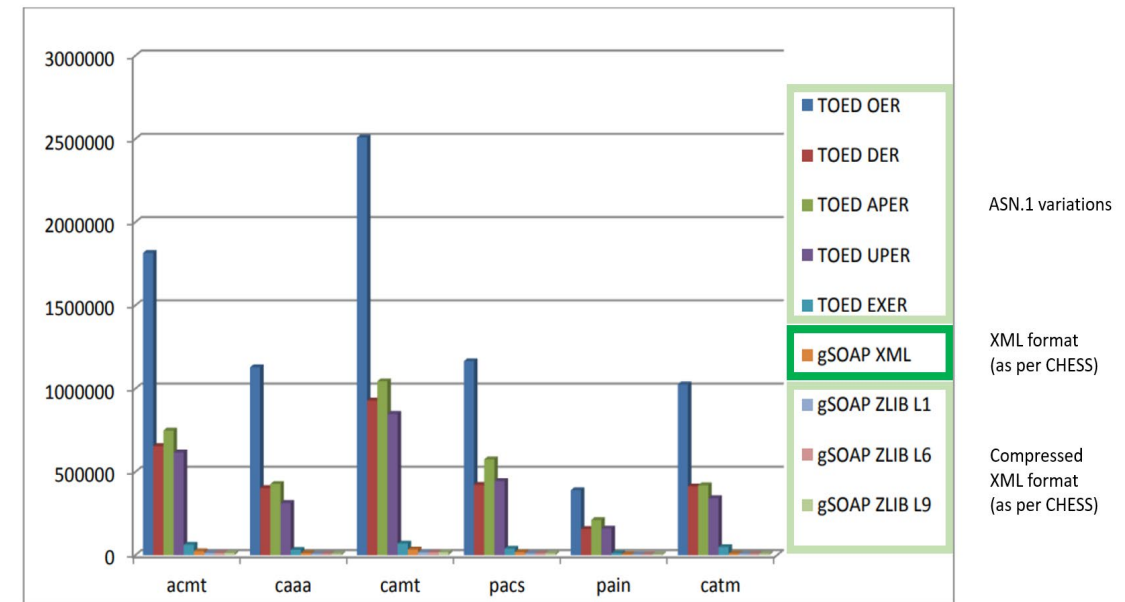


Figure 2 – Number of decoding operations per second

# Bandwidth Analysis

2023 September (5) : Investigate options for binary transmission of ISO 20022 for high volume Participants.

## Summary

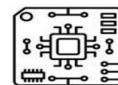
- 27GB during trading hours equates to an average bandwidth requirement of  $27\text{GB} \times 8\text{bits} / 6\text{hours} / 60\text{min} / 60\text{sec}$  bits per second = 10 Mbps.
- Noting that trades do not necessarily occur at the same rate throughout the day, the peak bandwidth requirement would need to be higher than the average.
- Modelling based on the all time peak from March 2020 indicates that a minimum of 200% of the average bandwidth would be required. That would equate to a required peak bandwidth of 20 Mbps.
- Further, AMQP 1.0 encoding of each ASCII character "over the wire" requires two bytes rather than one, doubling bandwidth requirements to 40 Mbps.
- The bandwidth on our standard ASX Net CPE devices are set at 50 Mbps in each direction but can be upgraded to up to 1.2Gbps, representing up to 60 times the forecast peak bandwidth.

## Conclusion

- The size of ISO 20022 XML messages can easily be accommodated within the bandwidth constraints of ASX Net. In addition, Participants can elect out of outbound messages signing which would halve the required bandwidth



Requires an average bandwidth of 10mbps  
(though **peak bandwidth requirement** would be **40mbps**)



ASX Net CPE Devices are set at 50Mbps in each direction but can be upgraded to 1.2Gbps, representing up to 30 times the forecast peak bandwidth



# ISO20022 Binary Transmission

2023 September (5) : Investigate options for binary transmission of ISO 20022 for high volume Participants.

## ***Conclusion***

- Given project objectives to align to other market infrastructures usage of ISO 20022, leverage work already done for ISO 20022 XML, and avoid unnecessary project complexity, the default action is to "Continue with XML format".
- Switching to ASN.1, or offering ASN.1 as an alternate format would require strong evidence of likely performance issues related to XML usage. An analysis of both decoding performance and bandwidth requirements has not found any strong evidence for this.
- To validate this conclusion, ASX is committed to providing results of an end-to-end performance benchmark as early as possible in the project.



# Scope Refinement Next Steps & Engagement

## **Open Action: 2023 September (2)**

Investigate and make recommendations on how the Technical Committee can collaborate with the Equities Settlement Payments Providers Sub Committee (ESPPSC).

## **Open Action: 2023 September (3)**

Clarify more detail on scope recommendations including next steps.

## **Open Action: 2023 September (7)**

Ensure Business Committee representatives are informed of Committee recommendations before the 11 October BC.

## **Open Action: 2023 September (8)**

Clarify the 'proceed to design' classification as part of the TC recommendation to BC (BC Paper).

# Business Committee Scope Refinement Update

The following scope objectives were endorsed by the Business Committee members on 11 October 2023.

## Scope Recommendations

### Categorisation/definitions

1. **Proceed to CHES Replacement design evaluation and consultation**
  - This evaluation will be based on the chosen solution option in parallel with support from relevant and appropriate industry forums or requisite working groups.
  
2. **Proceed to CHES Replacement design evaluation and consultation (and evaluate the opportunity to make improvements in current CHES)**
  - The feasibility of these objectives will also be explored in current CHES.
    - These are not expected to include any CHES code changes, but rather minor configuration or process changes.
  
3. **Further consideration**
  - These objectives will be brought back to the Technical Committee for further discussion and analysis. Where relevant and appropriate, industry forums may be consulted. These objectives, and any future objectives, will have the opportunity to be recommended to the Business Committee and C&S Boards for inclusion in the CHES Replacement design phase in the future.
  
4. **Not supported**
  - These objectives have not received sufficient support and will not be brought forward at this time.

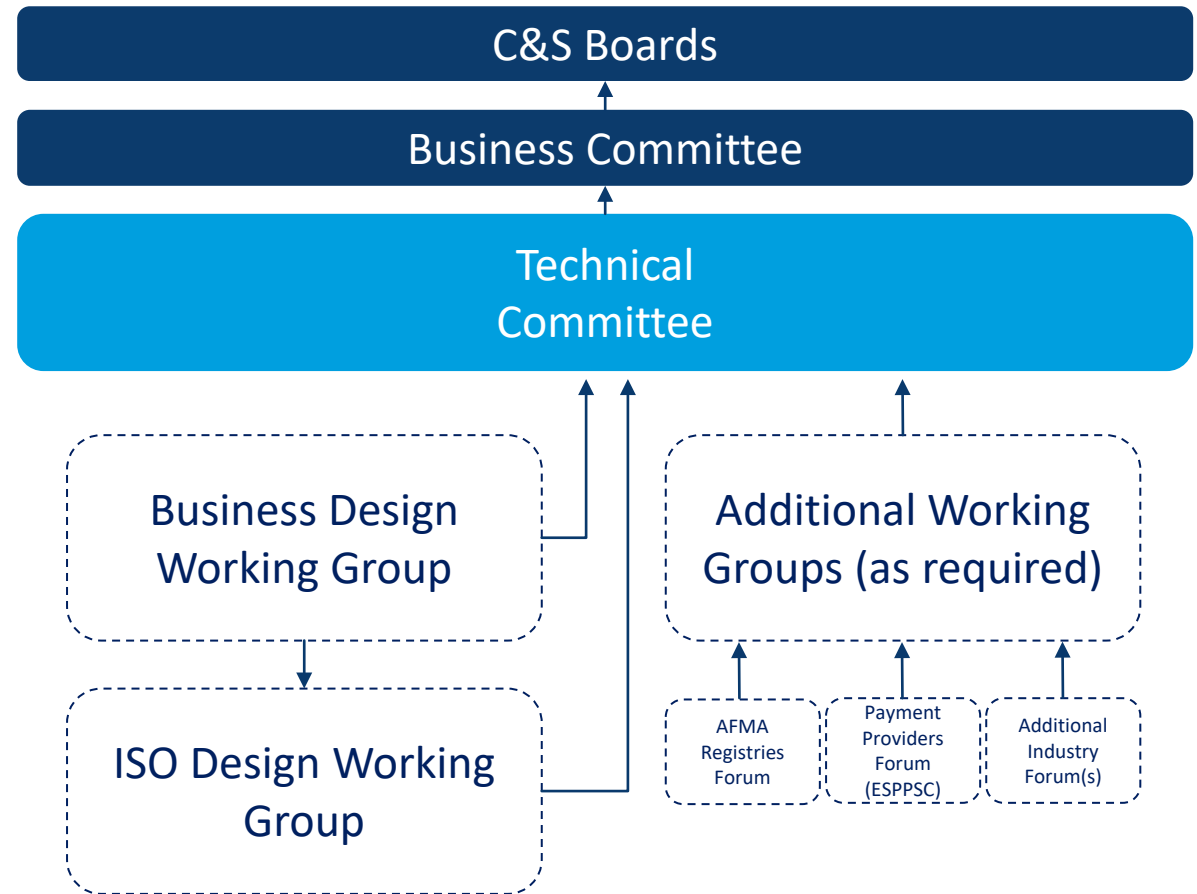
Topic	Functionality	Ref	Scope Objective	Recommendation
Sub-register and issuer sponsored	Registration Details and Investor Information	1.1	Standardise, improve and better synchronise the data sharing between participants and share registries	Proceed to design
	SRN Enquiry & Validation	1.3	Implement a faster and more efficient SRN enquiry process	Proceed to design
	Issuer Sponsored Improvements	1.4	Reduce settlement risk in relation to issuer sponsored sales	Proceed to design
	ETF Creations & Redemptions	1.5	Reduce operational risk in relation to the current ETF creation/redemption workflow	Proceed to design
	Continuous Holding Balance	1.6	Provide more efficient, reliable and faster access to holding information	Proceed to design
Settlement	Bilateral Matching Improvements	2.1	Reduce operational risk by ensuring participants are able to submit and match transactions in the system as soon as practical whilst minimising the likelihood of incurring a failed settlement (e.g. being able to separately match and schedule a transaction)	Proceed to design
		2.2	Reduce operational risk by minimising mismatches and failed matches by increasing the data sharing and matching fields available and/or making use of information available in upstream systems	Proceed to design
	Settlement Improvements	2.6	Scheduled Settlement CHES to CHES Transfer Request (MT107) - support usage within a participant group structure	Proceed to design
Corporate Actions	Electronic Dividend Claims	3.1	Review and enhance the current processes for automated claims (diary adjustments) to ensure it continues to meet the market needs.	Proceed to design
	Corporate Action Election and Acceptance Processing	3.2	Provide standardised straight through processing capability for corporate action elections and cost effective associated payments.	Proceed to design
		3.3	Reduce operational risk in relation to DRP standing instructions.	Proceed to design
	Electronic Notification of Payment Advice	3.5	Provide standardised electronic transmission of corporate action distribution information to create opportunities for automation and process improvement.	Proceed to design
	Other Corporate Action Efficiencies	3.6	Evaluate whether ASX can help with the transmission of bank account information in relation to bid offers	Proceed to design
	Other Corporate Action Efficiencies	3.7	Ensure holding adjustment reason codes are up to date and being used correctly	Proceed to design
	Other Corporate Action Efficiencies	3.8	Make sub-register state more readily available to participants to help improve processes in relation to de-listings	Proceed to design
In Scope – Consideration for design	Changes to Netting Process	4.1	Review the design for netting in the context of the solution	Proceed to design
	Changes to Settlement Process	4.2	Review the design for settlement in the context of the solution	Proceed to design
	Linking Bilateral Settlements	4.3	Settlement Linking – review and evaluate solution design	Proceed to design
	Settlement Lock for CHES Holdings	4.4	Settlement Locking – review and evaluate solution design	Proceed to design
	Non-batch DvP Bilateral Settlement	4.5	Bilateral Non-Batch DvP Settlement – review and evaluate in the context of payment processes	Proceed to design
Additional items potentially impacting design	Interoperability	5.3	Ensure the solution is designed to enable potential future interoperability between CCPs, SSFs and/or sub-registers	Proceed to design

# Proposed Technical Committee Operating Model CY24

## Establishment of working groups supporting the Technical Committee

Post solution announcement, ASX proposes the following operating model to support necessary industry engagement:

- Business Design Working Group (BDWG)
  - Responsible for the functional design of any new/changing scope
  - Includes Business and Operational SMEs from relevant organisations
- ISO Design Working Group (IDWG)
  - Responsible for the ISO20022 message designs and flows
  - Will be consulted on all messages
  - Includes Technical SMEs from relevant organisations
- Additional Working Groups
  - Members and responsibilities as required





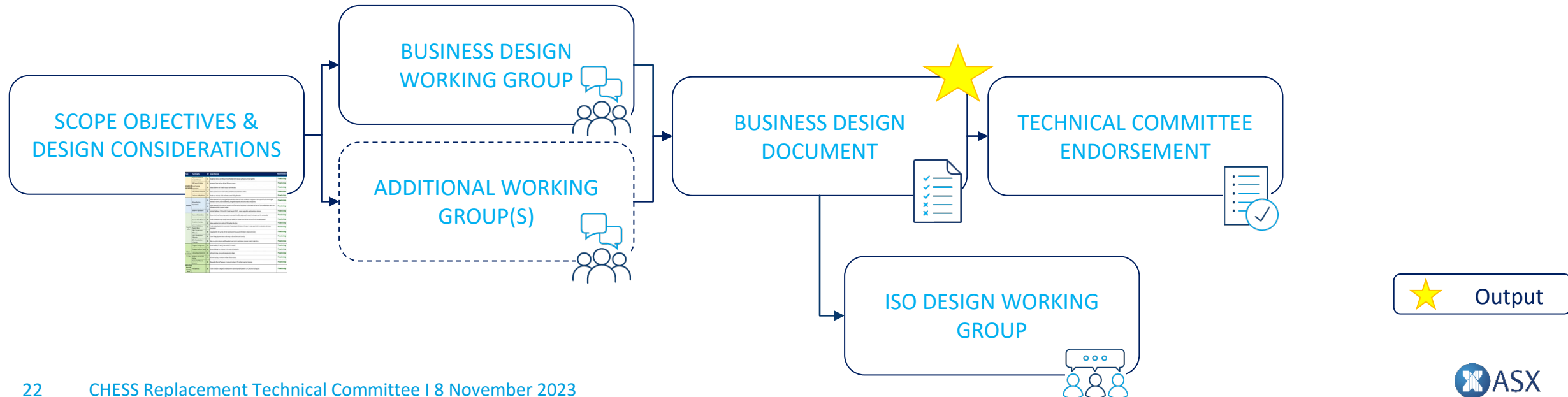
# Proposed next steps for the Scope Objectives (1/3)

How we turn high level scope objectives into CHES Replacement business design documentation

ASX proposes the following model for the Scope Objectives recommended to:

1. *Proceed to CHES Replacement design evaluation and consultation;* and
2. *Proceed to CHES Replacement design evaluation and consultation (and evaluate the opportunity to make improvements in current CHES);*

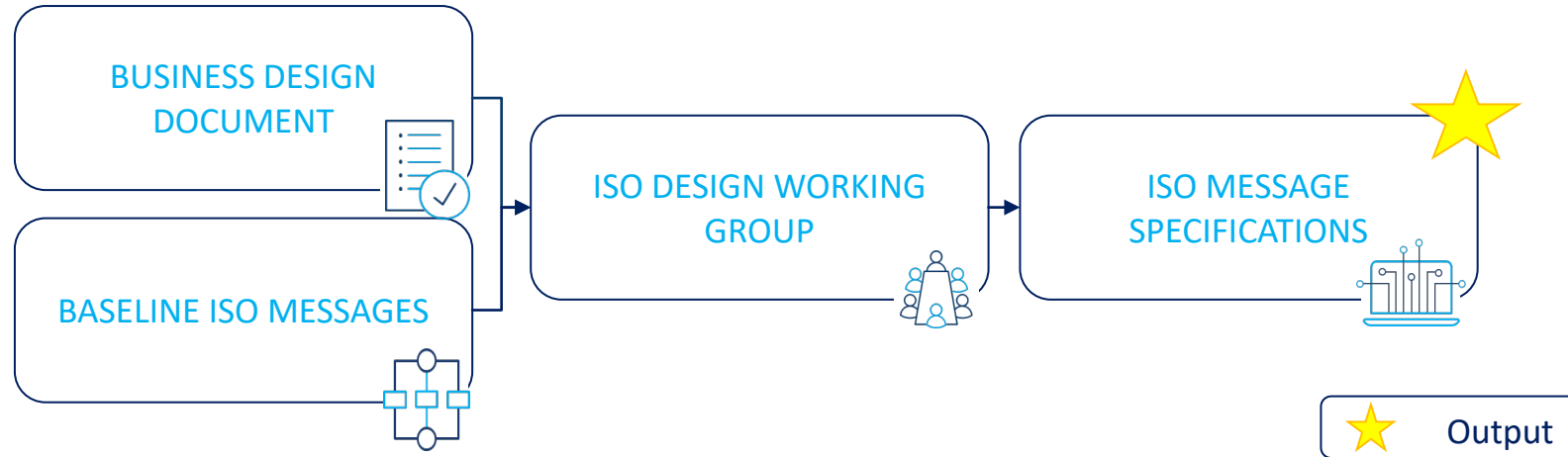
## Proposed design evaluation and consultation process:



# Proposed next steps for the Scope Objectives (2/3)

How we turn the scope objectives into technical design and re-review the existing ISO20022 messages

## Proposed ISO Design Working Group process:



# Proposed next steps for the Scope Objectives (3/3)

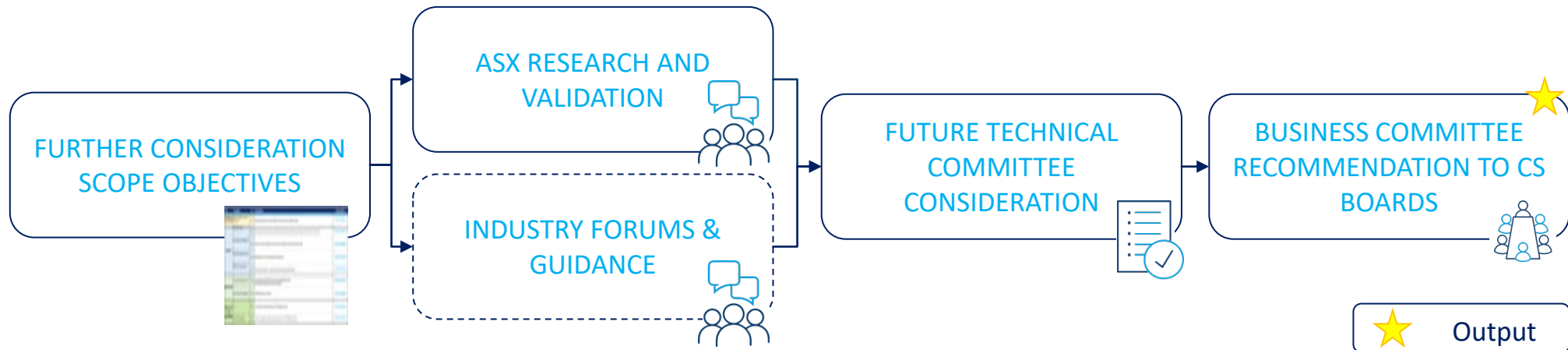
How we turn the scope objectives into technical design and re-review the existing ISO20022 messages

ASX proposes the following model for the Scope Objectives recommended to:

### 3. Further Consideration

These objectives will be brought back to the Technical Committee for further discussion and analysis. Where relevant and appropriate, industry forums may be consulted. These objectives, and any future objectives, will have the opportunity to be recommended to the Business Committee and C&S Boards for inclusion in the CHES Replacement design phase in the future.

### Proposed further consideration process:



# Forward work plan



# Forward work plan

Calendar invitations have been shared for monthly meetings in 2023



## Agenda items:

- Potential Solution announcement\*\*\*



## Business Committee meetings:

6 Dec 2023

~20 Mar 2024

~26 Jun 2024

## Future TC meetings:

~7 Feb 2024

~7 Mar 2024

~3 Apr 2024

~1 May 2024

~6 Jun 2024

\*\*\*TBC - ASX intends to hold an ad hoc virtual Technical Committee following any solution announcement.

(~) Anticipated dates.

# 2024 Schedule

## Proposed TC and BC schedule

TC Meeting	Proposed Date	Time
February meeting	Wednesday 7 Feb	2pm – 4pm
March meeting	Thursday 7 March	2pm – 4pm
April meeting	Wednesday 3 April	2pm – 4pm
May meeting	Wednesday 1 May	2pm – 4pm
June meeting	Thursday 6 June	2pm – 4pm
July meeting	Wednesday 10 July	2pm – 4pm
August meeting	Wednesday 7 Aug	2pm – 4pm
September meeting	Wednesday 11 Sept	2pm – 4pm
October meeting	Wednesday 9 Oct	2pm – 4pm
November meeting	Wednesday 6 Nov	2pm – 4pm
December meeting	Thursday 5 Dec	2pm – 4pm

BC Meeting	Proposed Date	Time
March meeting	Wednesday 20 March	12pm – 2pm
June meeting	Wednesday 26 June	12pm – 2pm
September meeting	Wednesday 18 Sept	12pm – 2pm
December meeting	Wednesday 11 Dec	4pm – 6pm

# Solution Communications Plan

## Timeline



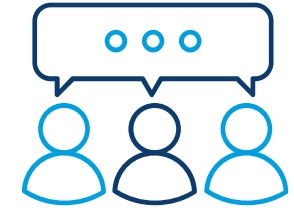
### STEP 1

Announcement



### STEP 2

Industry  
Webinar



### STEP 3

Technical  
Committee

HIGH LEVEL SOLUTION  
ANNOUNCEMENT

HIGH LEVEL SOLUTION  
ANNOUNCEMENT

SOLUTION DESIGN  
DEEP DIVE

HIGH LEVEL PROJECT  
TIMELINE

INDUSTRY  
Q&A

HIGH LEVEL PROJECT  
TIMELINE

# Observer playback



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Thank you.

