



# AN INTRODUCTORY WEBINAR ON **CORENET X**

| A ONE STOP INTEGRATED DIGITAL SHOPFRONT

**10 Sep 2021 – 5 Nov 2021**

*Note: CORENET X is currently under development  
and information shared in this presentation deck  
will be updated over time*



01

## Introduction to CORENET X

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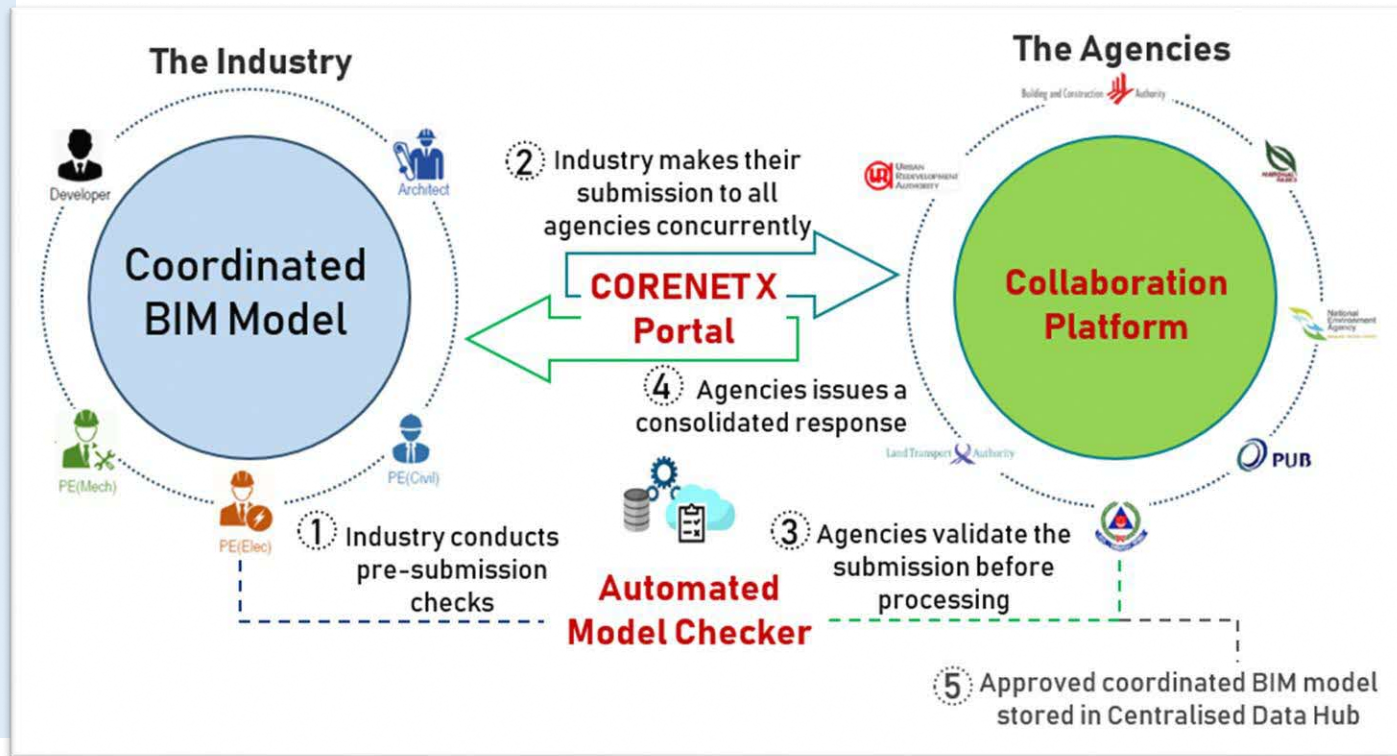
# Vision of CORENET X

A Future Ecosystem of Regulatory Approval of Building Works that Accelerates The Transformation of the Construction Industry

## FIRST IN THE WORLD One-Stop Integrated Digital Shopfront

### TRANSFORMATION of INDUSTRY

- Promote design coordination and teamwork
- Promote digitalization of construction sector
- Support IDD<sup>1</sup> & DfMA<sup>2</sup> imperatives



### TRANSFORMATION of REGULATORY AGENCIES

- Reduce silos, iterations & condense touchpoints
- Embrace collaboration & raise productivity amidst rising demands
- Improve accessibility & centralise information towards a Single Source of Truth

<sup>1</sup> IDD is the use of digital technologies to integrate work processes and connect stakeholders working on the same project throughout the construction and building life-cycle

<sup>2</sup> DfMA is a continuum of various technologies and methodologies that promote offsite fabrication from prefabricated components to fully integrated assemblies across the structural, architectural and Mechanical/ Electrical disciplines.

# Key Work Areas of CORENET X

## 2. TECH ENABLERS ●

### [Collaboration Platform]

Facilitate agencies' collaboration and coordination in regulatory processing

### [Automated Model Checker]

Enhance productivity for both the industry and agencies by automating part of the code compliance checks

### [OpenBIM Format]

Support interoperability and localized requirements – critical for both CP and MC



## 1. NEW REGULATORY PROCESS THROUGH SERVICE JOURNEY

- **Discovery Phase:** Service Blueprint and quick wins
- **Envisioning Phase:** Redesign of regulatory processes

## 3. GETTING READY FOR CORENET X ●

- **INDUSTRY:** Onboarding, Collaboration and Training on new process and requirements

02

## A New Regulatory Approval Process

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Process Re-engineering for Transformation

# New Regulatory Approval Process through Service Journey

Driving Transformation in Industry and Agencies : Envisioned Future State

## SERVICE JOURNEY 1.0

PHASE 0: DISCOVERY PHASE  
Service Journey Blueprint  
(mid Oct 18)

~4 months

Kick-Off  
**Interviews**  
**Workshops**



## SERVICE JOURNEY 2.0 (26 WEEKS)

KICK OFF:  
Commissioning  
(mid Jul 19)

PHASE 1:  
Visioning  
(Aug 19)

PHASE 2:  
Design  
(Oct 19)

PHASE 3:  
Implementation Planning  
(mid Dec 19)

~4 wks

~8 wks

~10 wks

~4 wks

Kick-Off/  
Commissioning  
Checkpt  
Visioning Checkpt  
**Interim Checkpt**  
Design Checkpt  
Final Checkpt

**Visioning Workshop**  
**Detailed Design Workshop(s)**



Engaged **6** TACs



Engaged **57** firms

• Comprising Developers, Consultants (architectural, C&S and M&E), and Builders

7 Sessions involved

**106** industry reps  
**39** agency reps

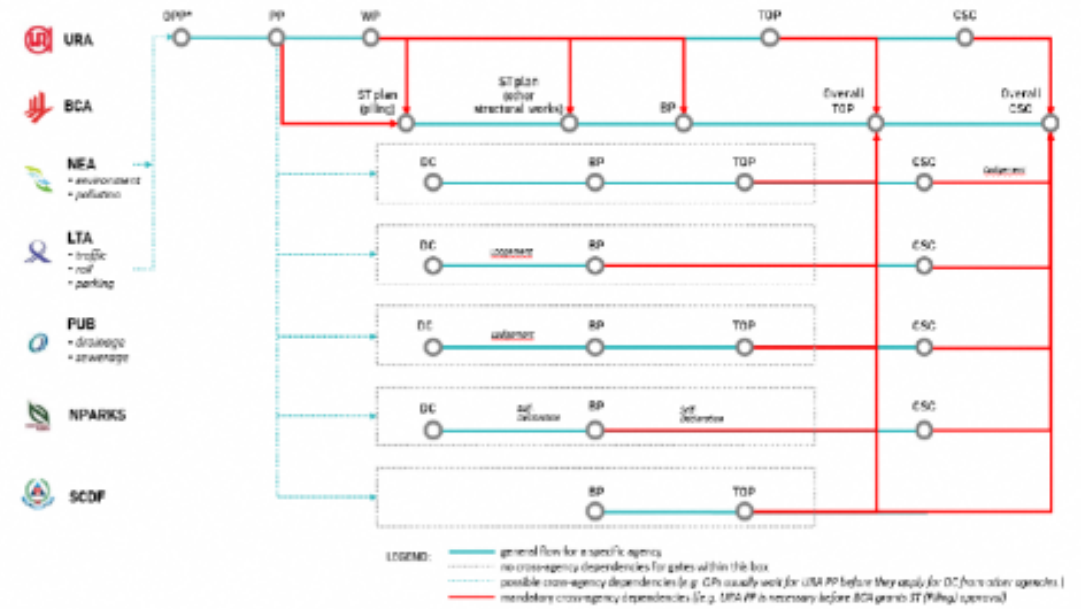
Consulted

**56** BIM Managers

# New Regulatory Approval Process through Service Journey

## Background – Current Regulatory Approval Process

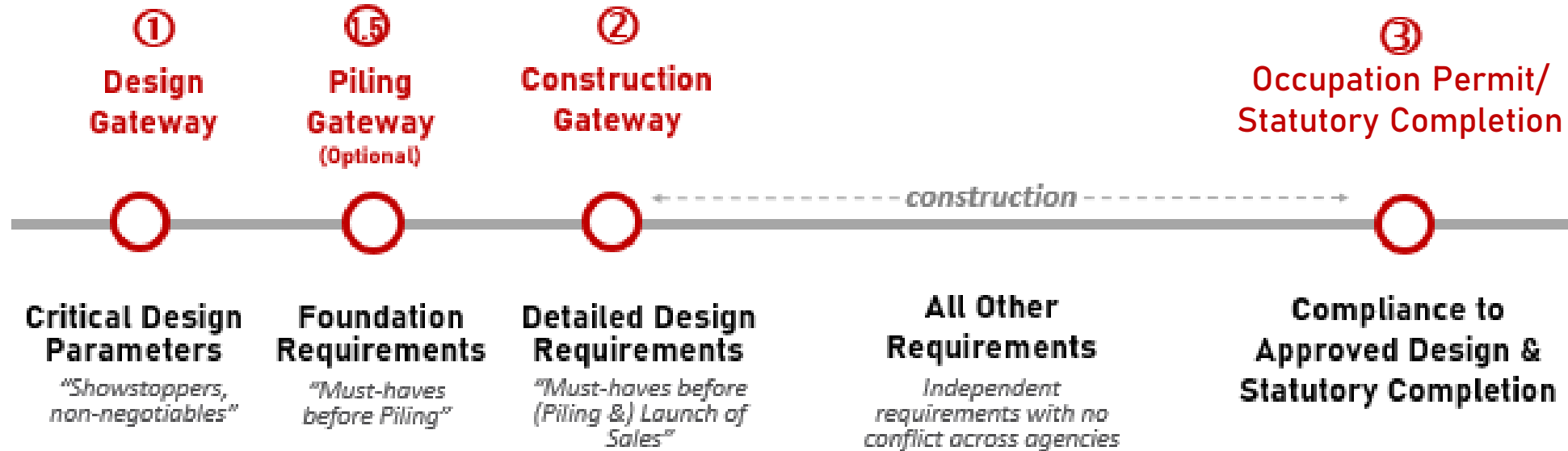
- All building developments in Singapore are regulated by 8 key regulatory agencies – BCA, LTA, NEA, Nparks, PUB, SCDF and URA, with SLA handling land + strata matters
- Projects are required to obtain regulatory approvals from the relevant agencies at various milestones of the project.
- Currently, QPs can make separate submissions to individual agencies based on project progress.
- Under the current approval process, a typical building project will need to undergo over 20 approval gates across 8 agencies.



- Review in silos through over 20 approval touchpoints with separate responses
- Fast, but disjointed
- Uncoordinated design, submissions in silos
- Abortive works from conflicting plans
- Overall lower productivity

# New Regulatory Approval Process through Service Journey

Driving Transformation in Industry and Agencies : **Envisioned Future State**

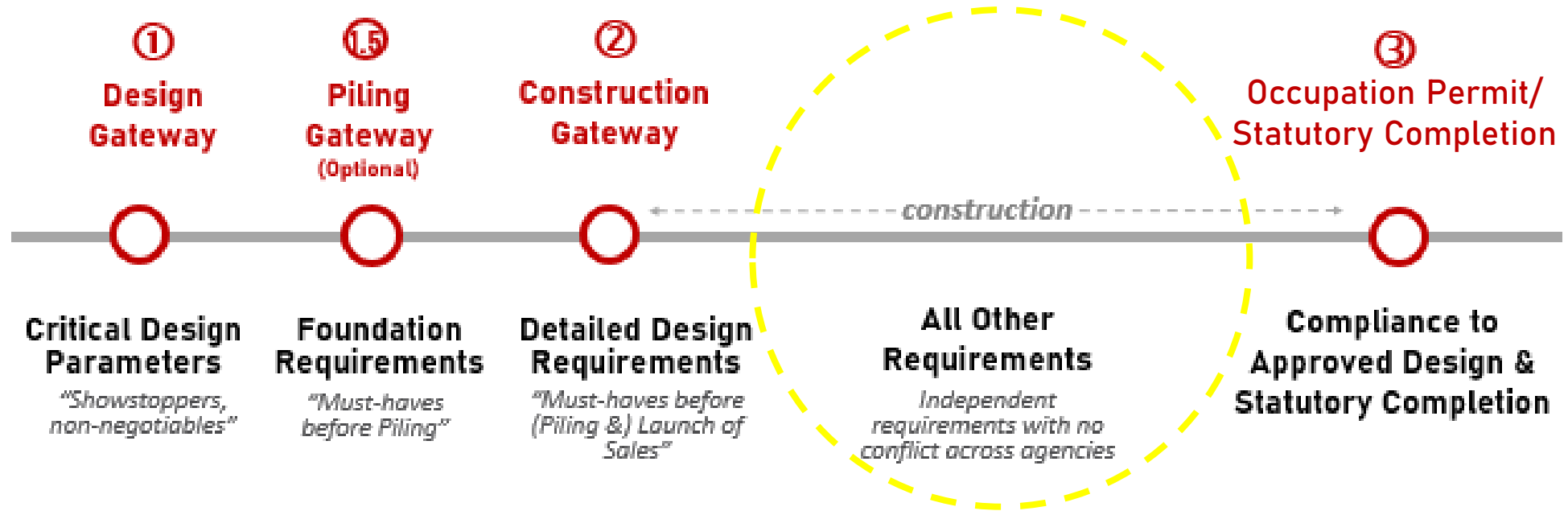


- The new regulatory approval process streamlines the multiple touchpoints into key submission gateways.
- At these gateways, coordinated submissions (consisting of various building disciplines) will be submitted and reviewed collectively by agencies. This helps to ensure cross-agency issues and conflicts are identified upfront.



# New Regulatory Approval Process through Service Journey

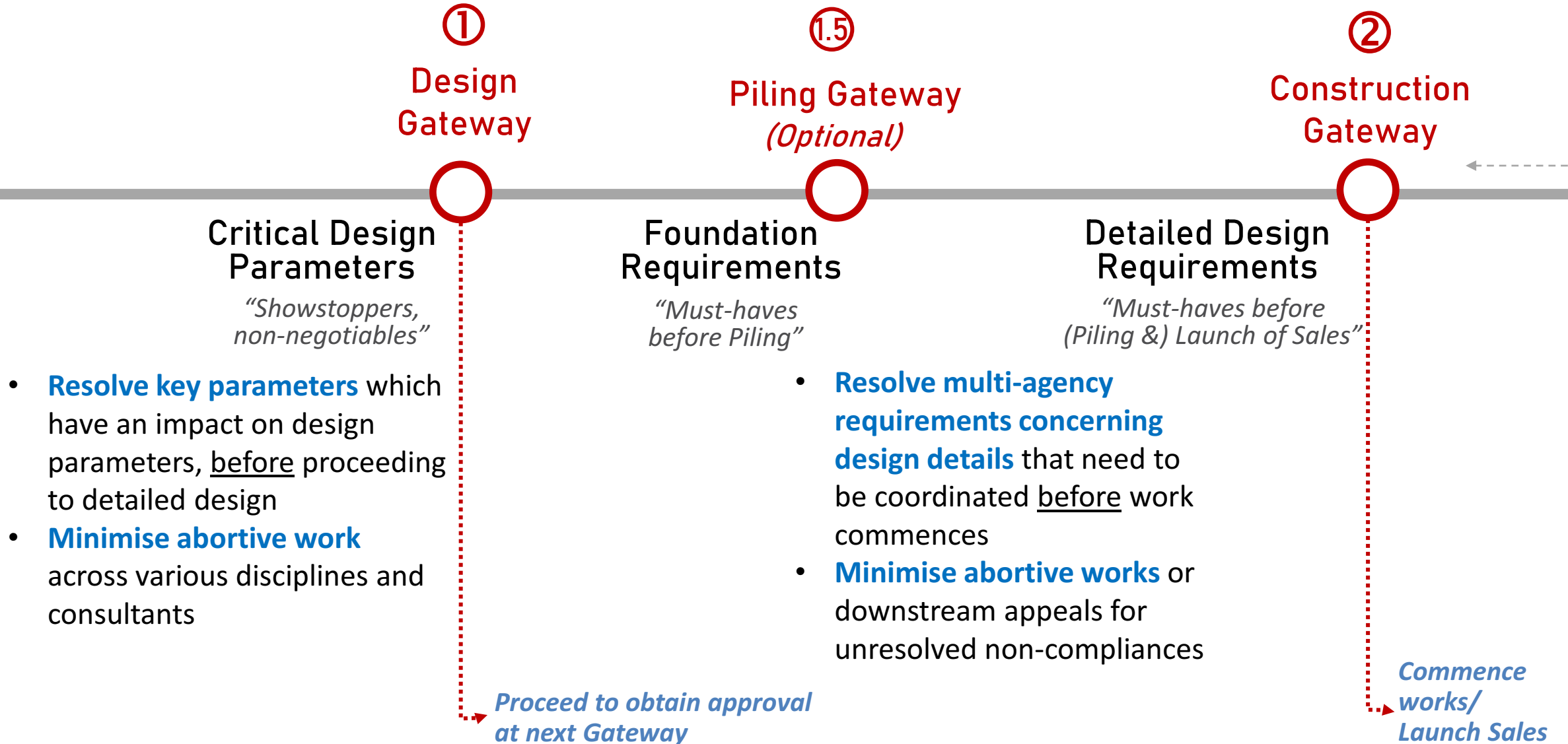
Driving Transformation in Industry and Agencies : **Envisioned Future State**



- Agency-specific requirements (e.g. technical details of building components) can then be supplemented at later stages and be reviewed by the individual agency.
- This new process aims to provide clarity on the dependency to each stage, ensuring the imposition of requirements are timely, allowing specific details to be submitted separately without affecting the overall approval at each milestone

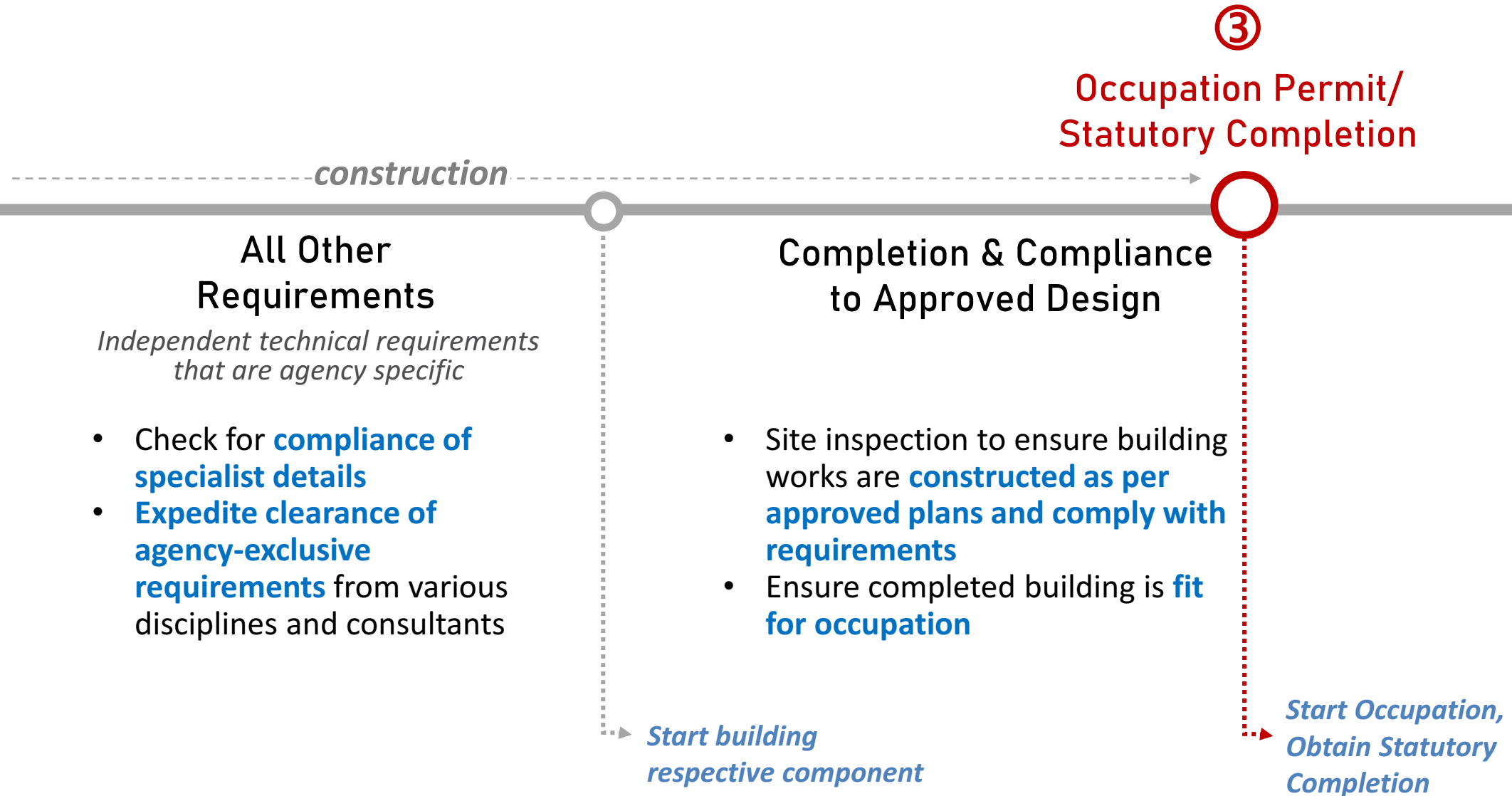
# New Regulatory Approval Process through Service Journey

Driving Transformation in Industry and Agencies : **Envisioned Future State**



# New Regulatory Approval Process through Service Journey

Driving Transformation in Industry and Agencies : **Envisioned Future State**



03

## Technological Enablers

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Leveraging on BIM technologies

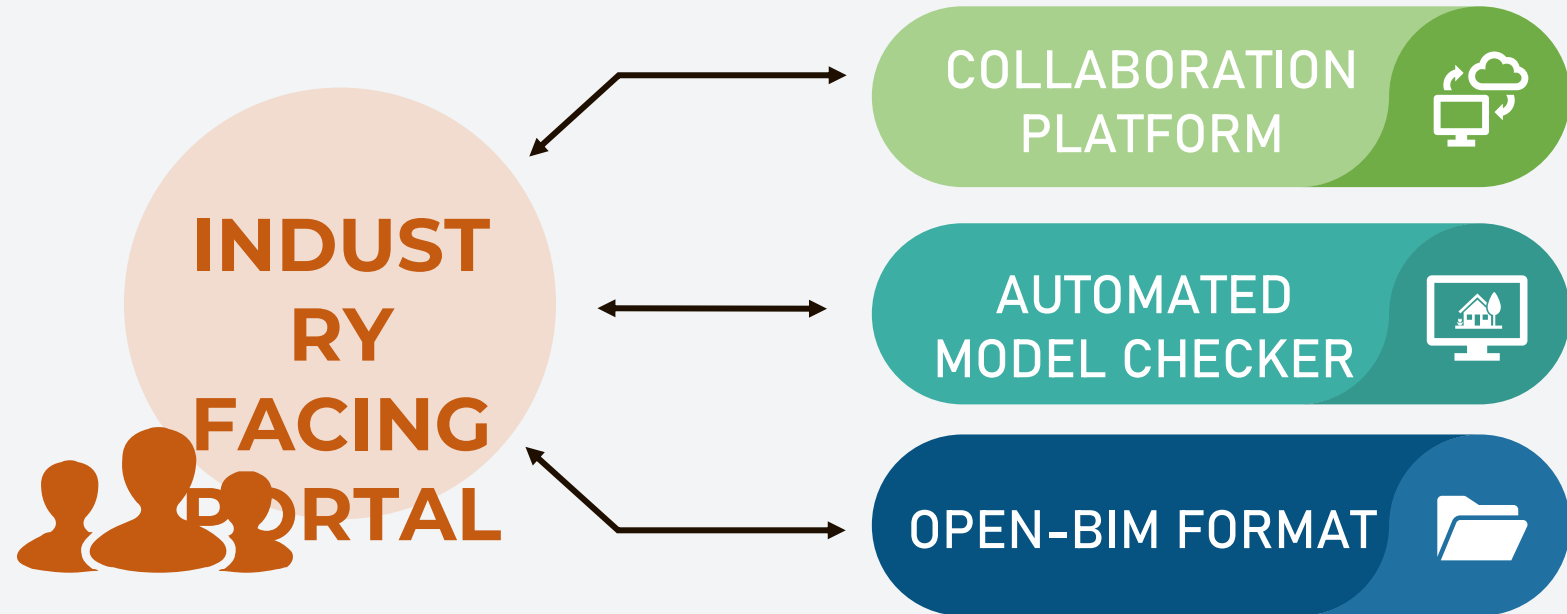
# Development of Technological Enablers

Through Agile Approach and Pilot Trials

CORENET X consists of various technological pieces

## Industry facing portal

- Total redesign to provide a new end-to-end experience based on user's journey



3 Key Technological Enablers

# Collaboration Platform

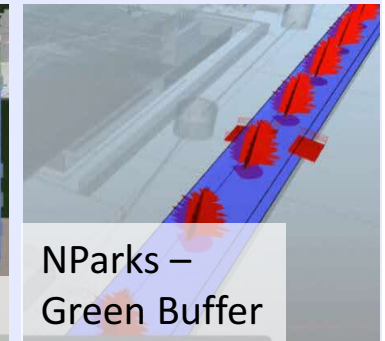
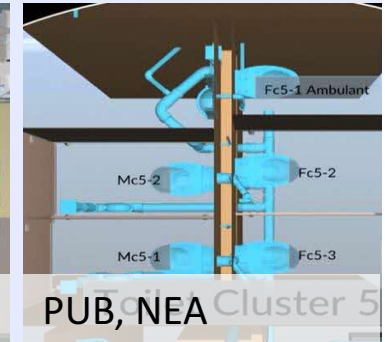


Agencies review submissions collectively and provide coordinated responses

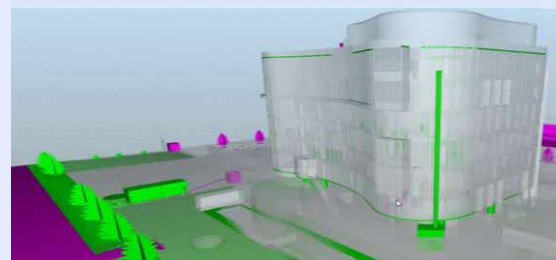
- Extraction of different views / areas of interest for review from the same model
- Concurrent review & virtual collaboration among agencies on the platform
- Issuance of coordinated response to industry



## Extracted Views from the model



## Highlighting amendments



## Virtual Collaboration





## 1. Enabling Collaboration & Comms

- Collaboration between agencies on Platform
- Ease of communication with Industry on issues
- **Eliminates** unclear and lengthy iterations

## 2. Capitalization of Data and BIM

- Extract and visualize data according to Agencies' requirements
- **Eliminates** the need for manual and excessive annotations

## 3. Use of Tech to improve efficiency

- Capability to identify amendments
- **Eliminates** massive Industry's efforts in preparing amendment plans

# Automated Model Checker



- **Auto-Checking** for regulatory non-compliance against rules across 7 key agencies, across 3 building disciplines (Architectural, Civil & Structural, Mechanical & Electrical)
- **Allow pre-check** by industry prior to submission

Sample views extracted from prototype



Highlight non-compliance - Door did not meet minimum door width requirement



Summary report on number of non-compliances detected

## SELF-CHECK

Allow industry to self-check prior to submission



## EFFICIENT

Improve turnaround time and overall efficiency

## CONSISTENT

Ensure consistent interpretation of requirements





# OpenBIM Format



## CURRENT REALITY

- Industry uses diverse Proprietary BIM software available in the market



## IFC (Industry Foundation Class)

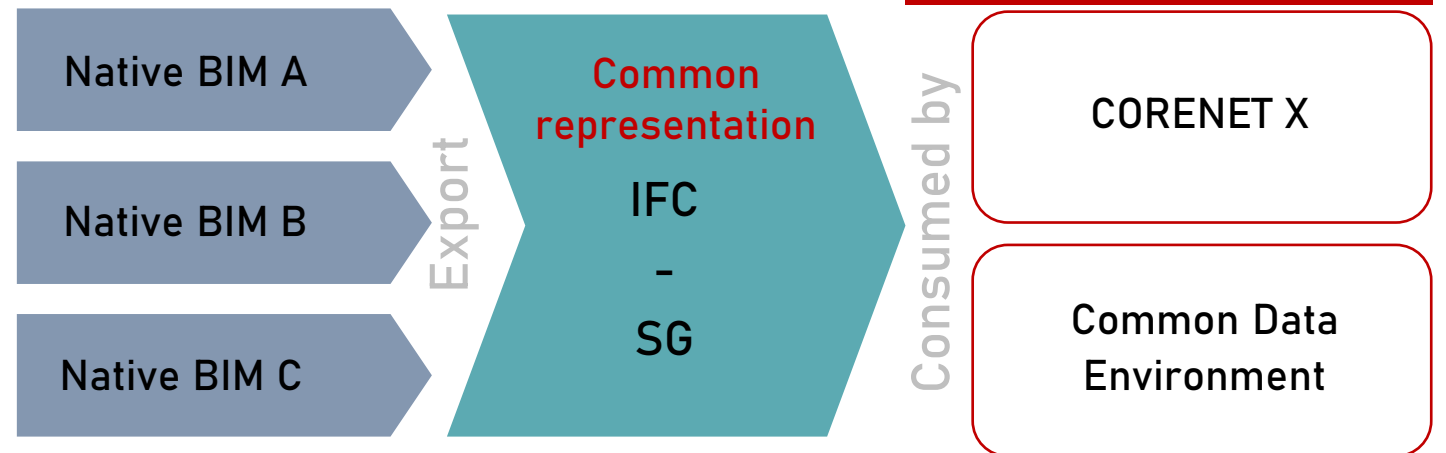
An international open BIM format to facilitate interoperability in building and construction industry

## CURRENT GAP

- A need for **platform-neutral** format to facilitate **collaborative workflows**
- A need for **interoperability** among different software

## DEVELOPMENT OF IFC-SG

- **Adoption of IFC**
- Development of **extension IFC-SG** common representation for **local** requirements and regulatory needs

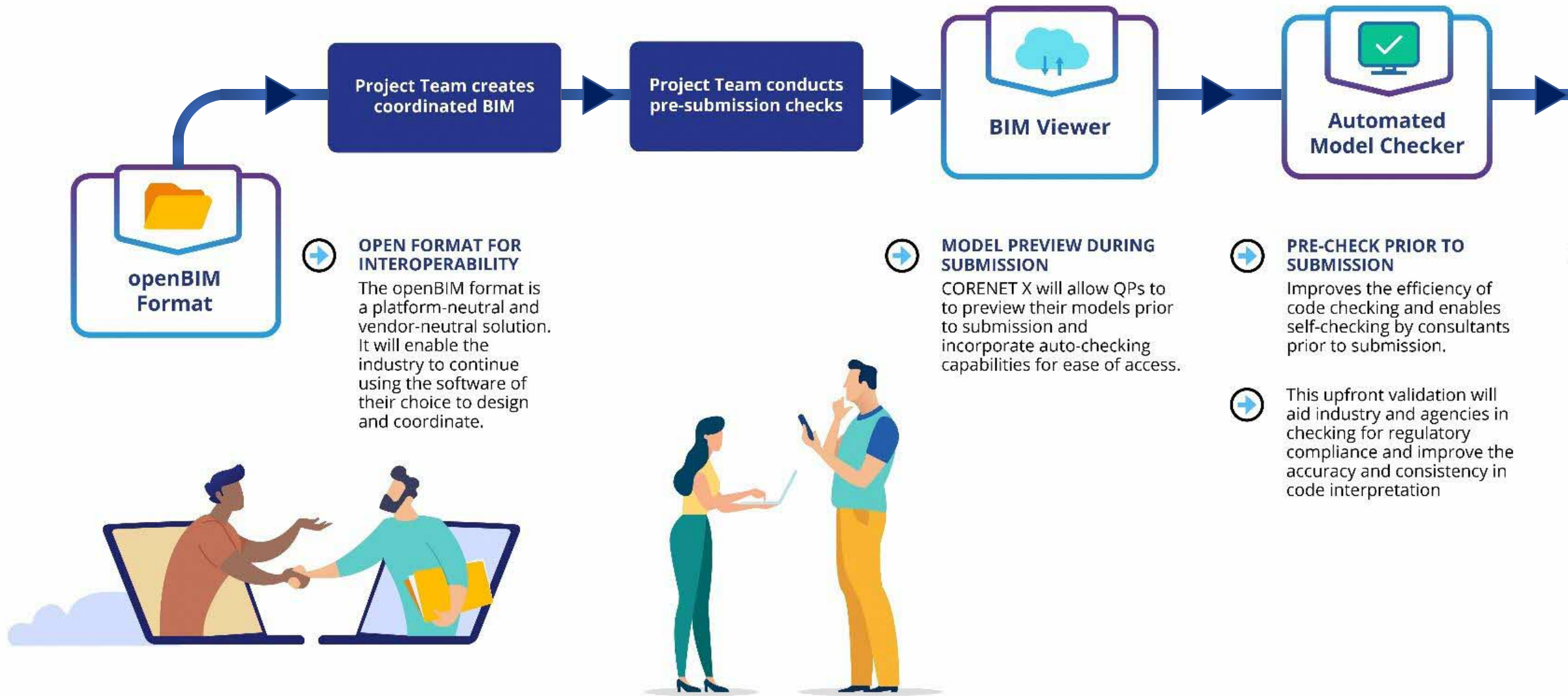


**INTEROPERABILITY** and **OPEN DATA STANDARDS** are crucial and important



## IFC Outreach from BIM Software Developers

<b>Understanding Software Functions</b>	<b>Incorporating Customized Requirements</b>	<b>Modelling Effort</b>	<b>Help Resources &amp; Contacts</b>
Recommended specs or settings for quick exports	Customizing and exporting properties into an IFC model	Software templates and configuration to help with modelling and export	Online materials and local helpdesk contacts to provide timely response



**openBIM  
Format**



**OPEN FORMAT FOR INTEROPERABILITY**

The openBIM format is a platform-neutral and vendor-neutral solution. It will enable the industry to continue using the software of their choice to design and coordinate.



**MODEL PREVIEW DURING SUBMISSION**

CORENET X will allow QPs to preview their models prior to submission and incorporate auto-checking capabilities for ease of access.



**PRE-CHECK PRIOR TO SUBMISSION**

Improves the efficiency of code checking and enables self-checking by consultants prior to submission.



This upfront validation will aid industry and agencies in checking for regulatory compliance and improve the accuracy and consistency in code interpretation



### LEVERAGING TECHNOLOGY TO EXTRACT RELEVANT INFORMATION

**New Submission** - Today, QPs need to prepare different sets of plans for different agencies. Leveraging technology, QPs will prepare one coordinated model and agencies will extract relevant information. This reduces the need for manual annotations on plans.

**Amendment Submission** - Today's amendment plans require QPs to prepare the submission highlighting deviations from earlier approved submissions. This process is currently carried out by QPs manually.

Going forward, QPs will only need to submit the amended model. Agencies will conduct model comparison with the previously approved model to identify amendments made.



### COLLABORATION AMONG AGENCIES

Aims to transform the current way agencies review plans, bringing agencies together to concurrently access the same coordinated BIM model.

Agencies will then collaborate within the same Collaboration Platform, and provide a coordinated response to the industry.



Agencies issue a consolidated response to the Project Team



### ENABLES CLEARER COMMUNICATION

Today's Written Direction and comments from agencies are provided in a list to the QPs.

Leveraging technology, the comments will also be provided in the BIM Collaboration Format (BCF), which allows tracking and tagging of comments directly to the BIM model.

This aims to improve the current communication between industry and agencies.



04

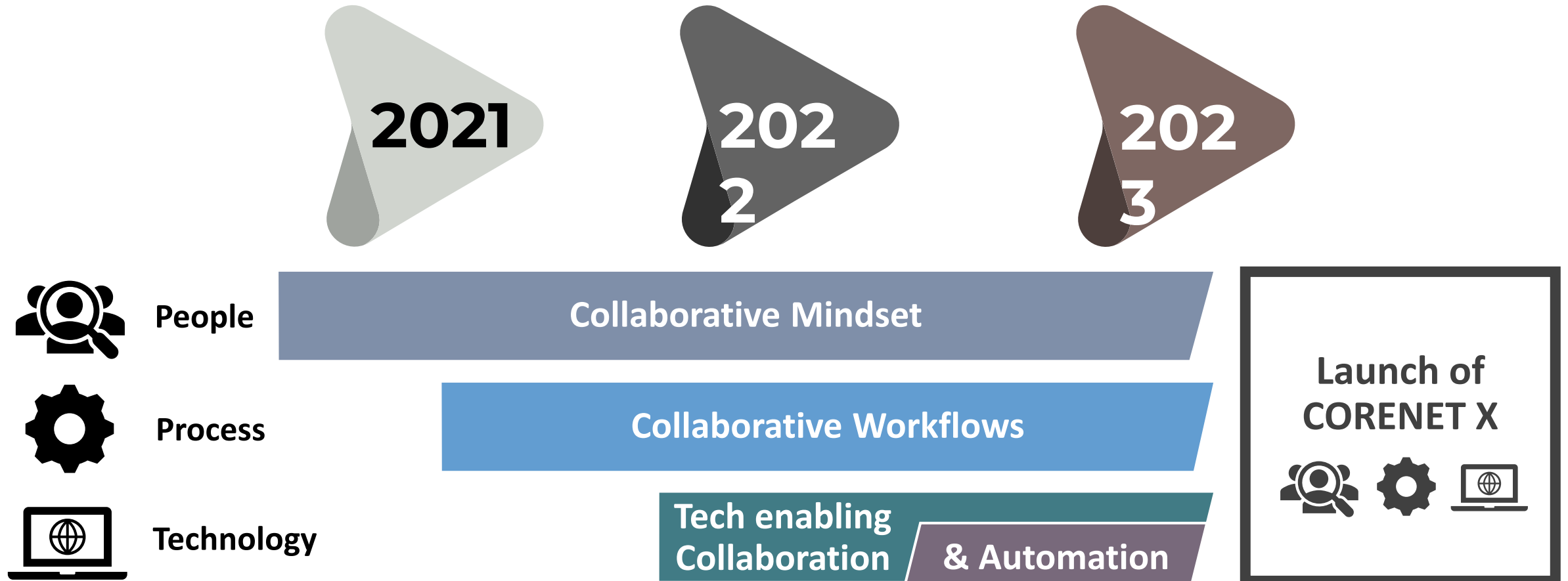
## Getting Ready for CORENET X

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Roadmap towards Transformation

# Key Phases of CORENET X Transformation

- CORENET X is a large-scale development with multiple pieces of works
- Involving fundamental changes to the way agencies and the industry handle regulatory submissions
- The key phases are planned in consideration of 3 key factors: People, Process and Tech



# Getting the Industry Ready

## Outcomes



### AWARENESS

1. Industry is **aware** of the changes and benefits of CORENET X that will impact them



### COLLABORATION

2. Industry and Agencies **collaborate** together to share ideas and improve CORENET X



### PREPARATION

3. Industry implements in-house plans to **prepare** for transition to CORENET X



# Getting the Industry Ready

## Key Activities



### Engagement with Key Stakeholders

- BCA annual QP briefing
- IDD Steering Committee Meeting
- Engagement with TAC
- Start of CX Industry Community of Practice

### Official Public Announcement @ IBEW 2021

- Industry webinars supported by TACs
- Launch of CX website and intro toolkit for industry

### Phase 1 Webinars : CX Basics

- Basic process onboarding
- Basic IFC capability
- Focus on CX Readiness within a firm

### Reinforcing CORENET X @ IBEW 2022

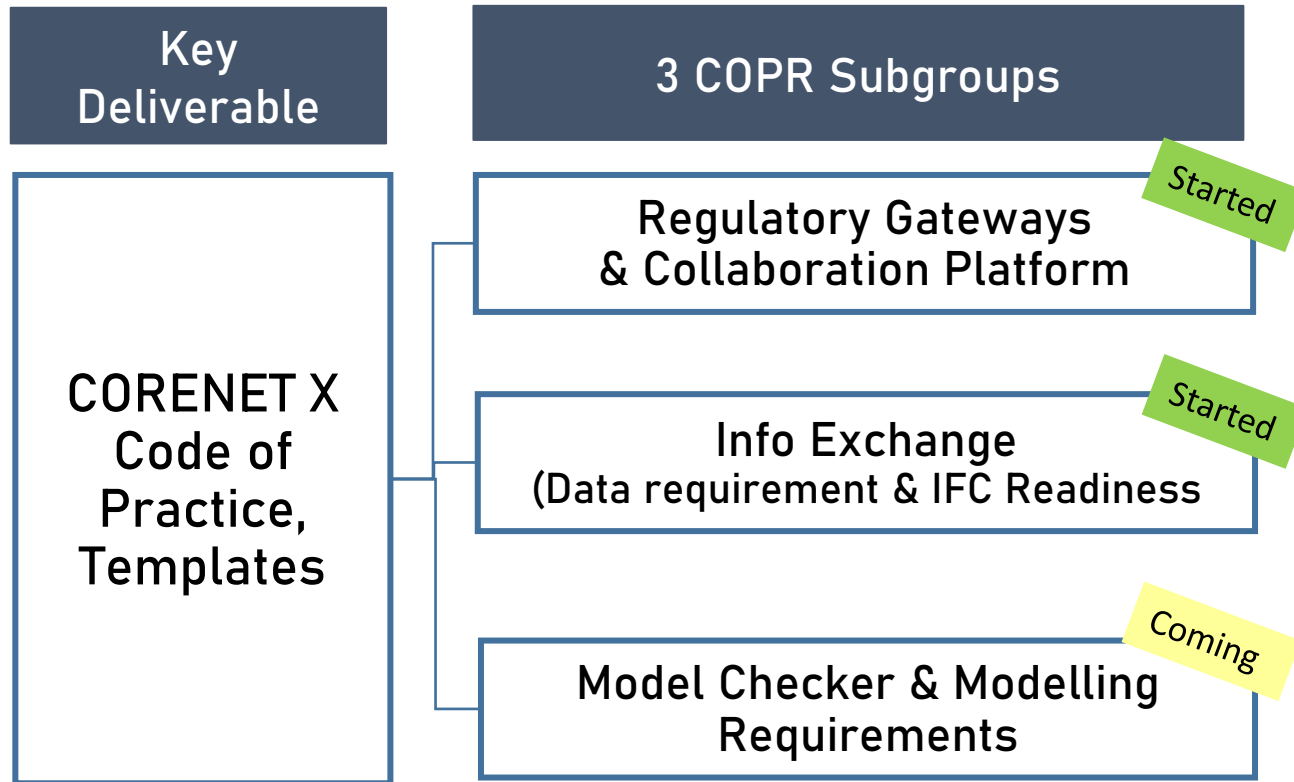
- Focus on data requirements and validation
- Sharing of success stories (pilots) of firms who are CX Ready

### Phase 2 Webinars : Submission to CX

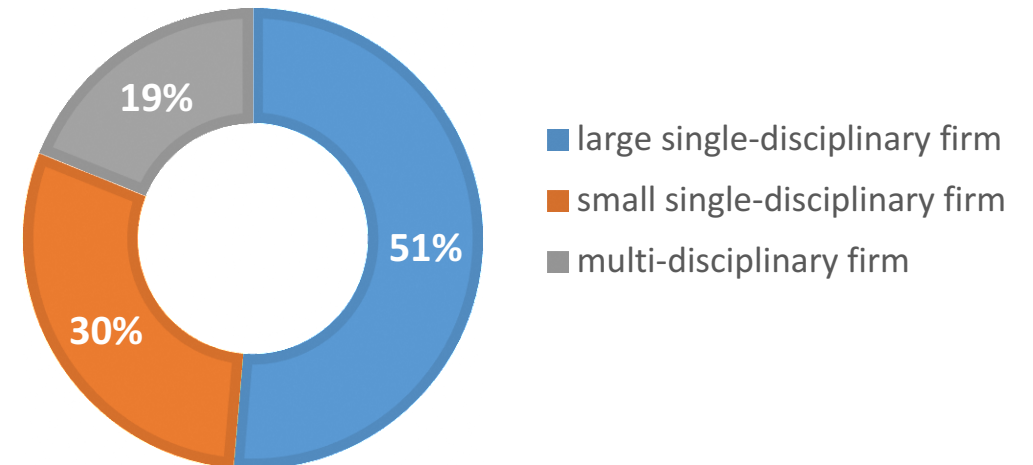
- Administrative and technical details of submission
- Circulars on actual launch details
- Set up helpdesks to manage industry transition queries

# Getting the Industry Ready

## Overview of the Community of Practice



- BIM Managers and Digital Leads from 37 firms
- Engage and co-create with the industry
- Gather insights on industry best practices
- Validate proposals and identify areas of improvement



# Getting the Industry Ready

## Discussions in the Community of Practice

**Exploring Pilots with  
Collaboration  
Platform**

**IFC Challenges for  
Today, and Ways to  
Overcome them for  
the Future**

**Exploring ST  
Requirements for the  
Collaboration  
Platform**

**Coordinated IFC  
among Small Firms**

**BIM Data  
Management in  
Projects and  
Submissions**

**Clarifications and  
Updates for Future  
Regulatory Approval  
for Building Works**

**In-house Transition  
to CORENET X**

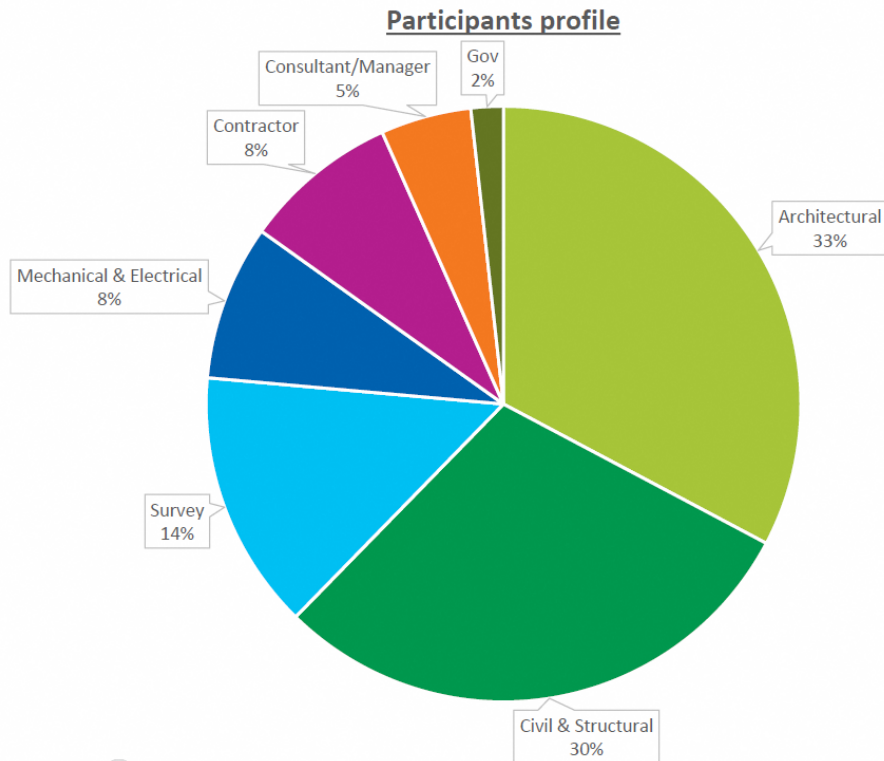
**CORENET X  
Modelling  
Requirements**

and  
more...

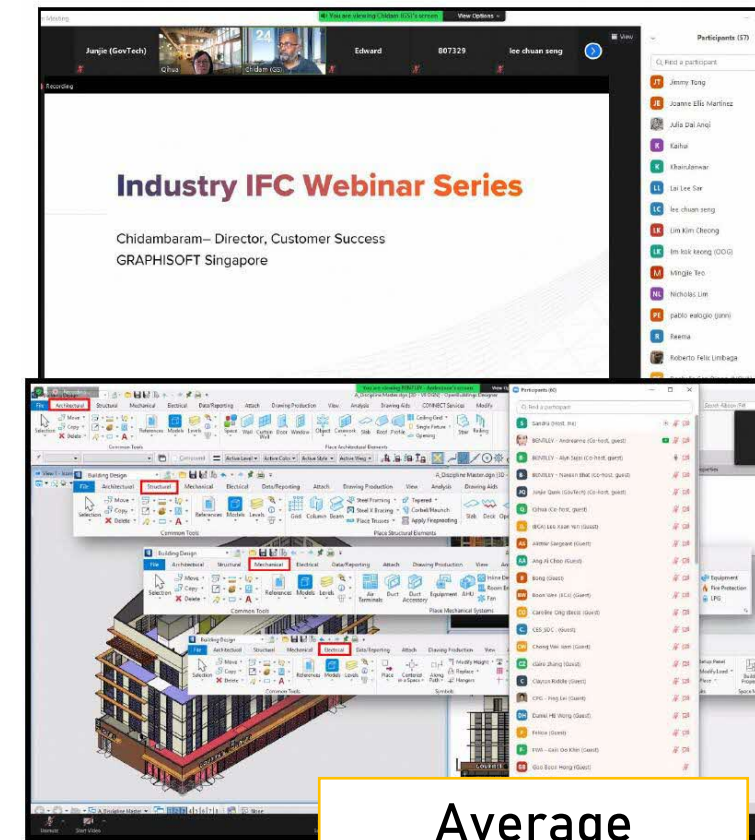
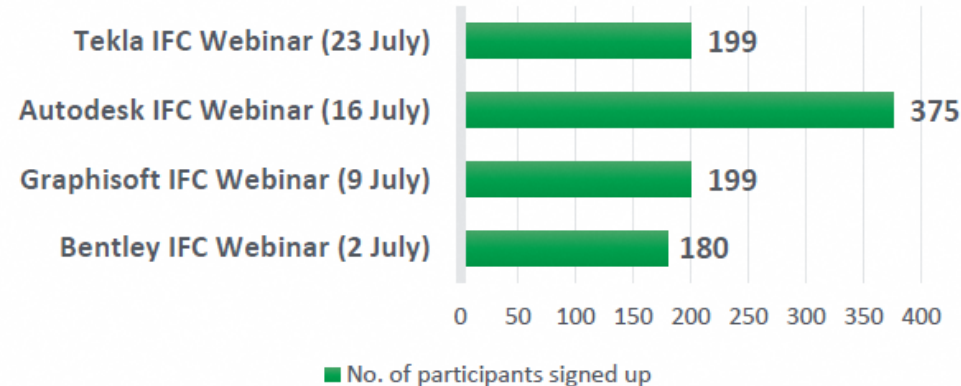
# Getting the Industry Ready

## IFC Webinars by BIM Software Vendors

- Importance of multi-disciplinary BIM-based coordination
- Latest BIM software developments to support use of IFC
- Features and tips when exporting to IFC format
- Hands-on demos by BIM software developers



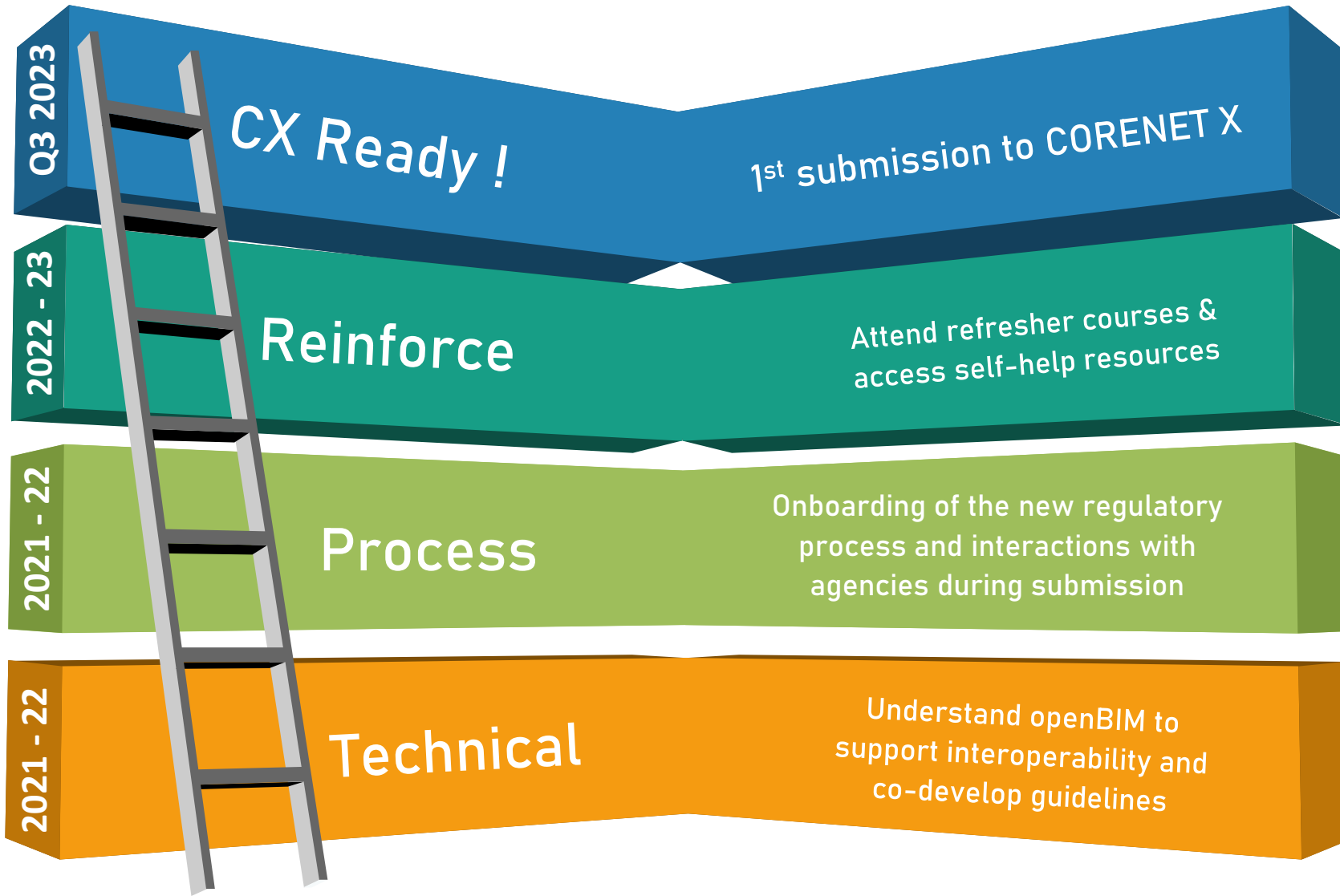
No. of participants signed up



**Average Webinar Rating : 4.3/5**

**Back by popular demand 2<sup>nd</sup> run will be organized by end 2021**

# Getting the Industry Ready



## Training Calendar

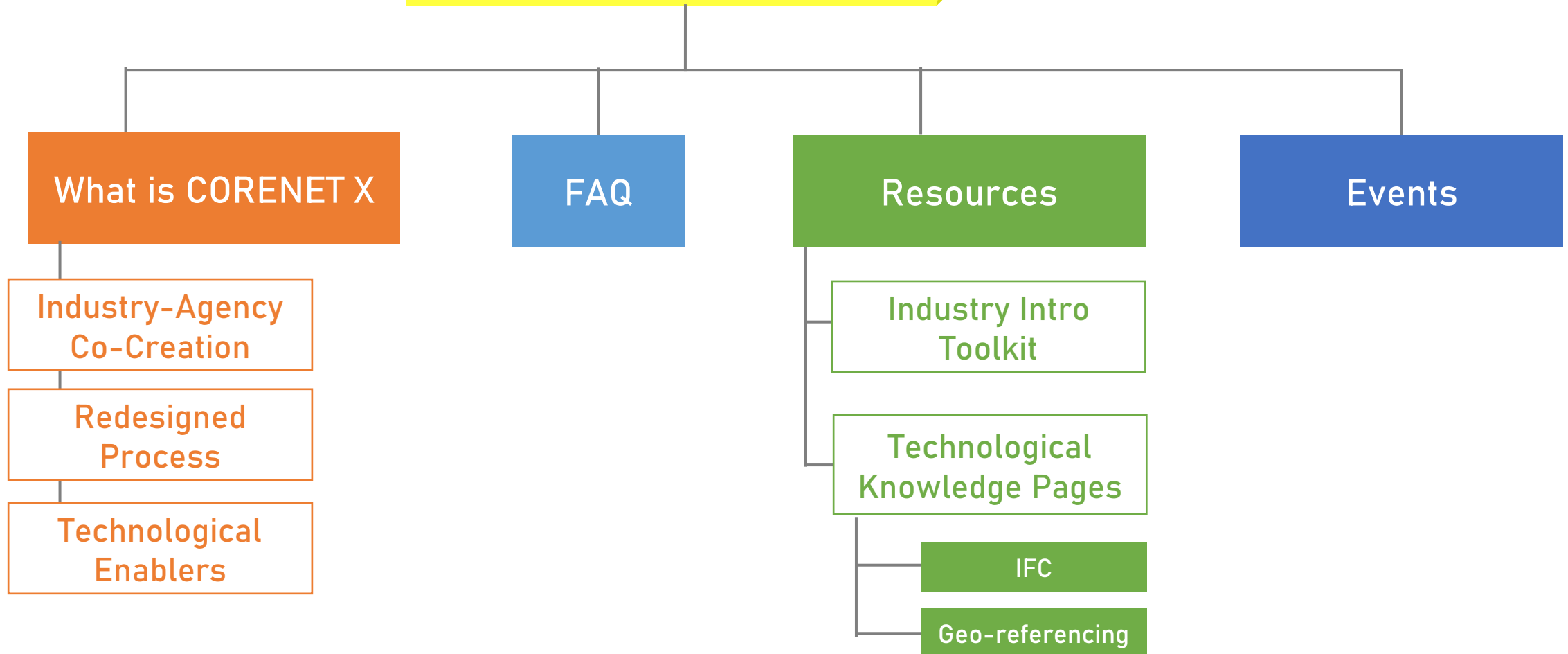
Now to 2022  
Webinars and  
Community of Practice

2022  
Phase 1) Training on  
CORENET X Basic  
Onboarding

Phase 2) Training on  
Submissions to  
CORENET X

# One-Stop Website for Updates, Events, Resources and Contacting Us

**CORENET X Website**  
<https://go.gov.sg/cx>





More details on CORENET X can be found at  
<https://go.gov.sg/cx>



We welcome your feedback, suggestions and queries on  
CORENET X (including the Community of Practice) at  
<https://go.gov.sg/cxfeedback>



Register for IFC Webinars organized by BIM Software  
Vendors (Autodesk, Bentley, Graphisoft, Trimble) at  
<https://go.gov.sg/ifcwebinarseries>

