



# ComplyPro delivering Progressive Assurance

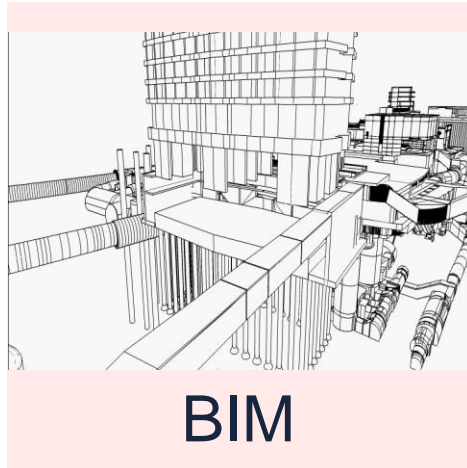
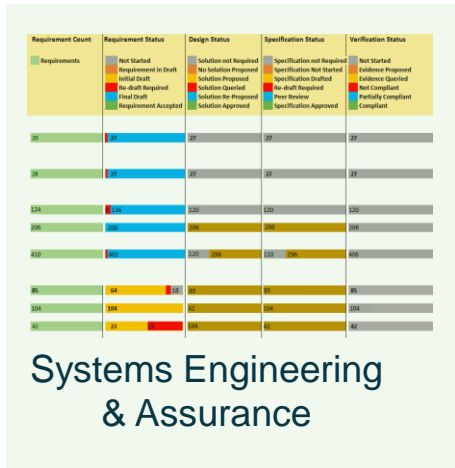
*How **Progressive Assurance** Supports Systems Engineering Best Practice  
Across the Rail Asset Lifecycle*

*BIM & Beyond, Riga 2018*

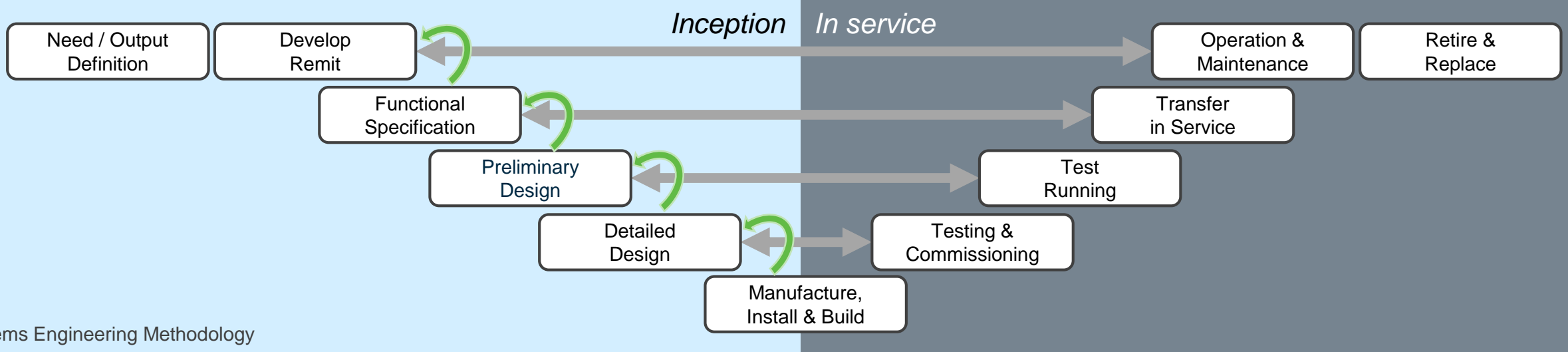




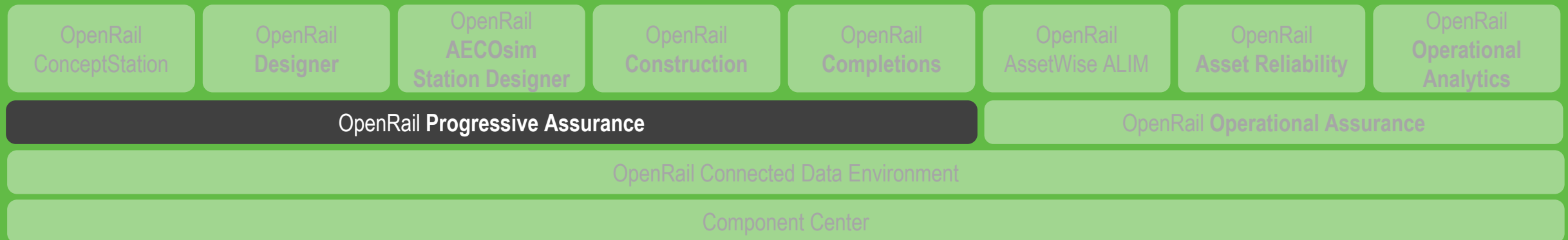
# Systems Engineering







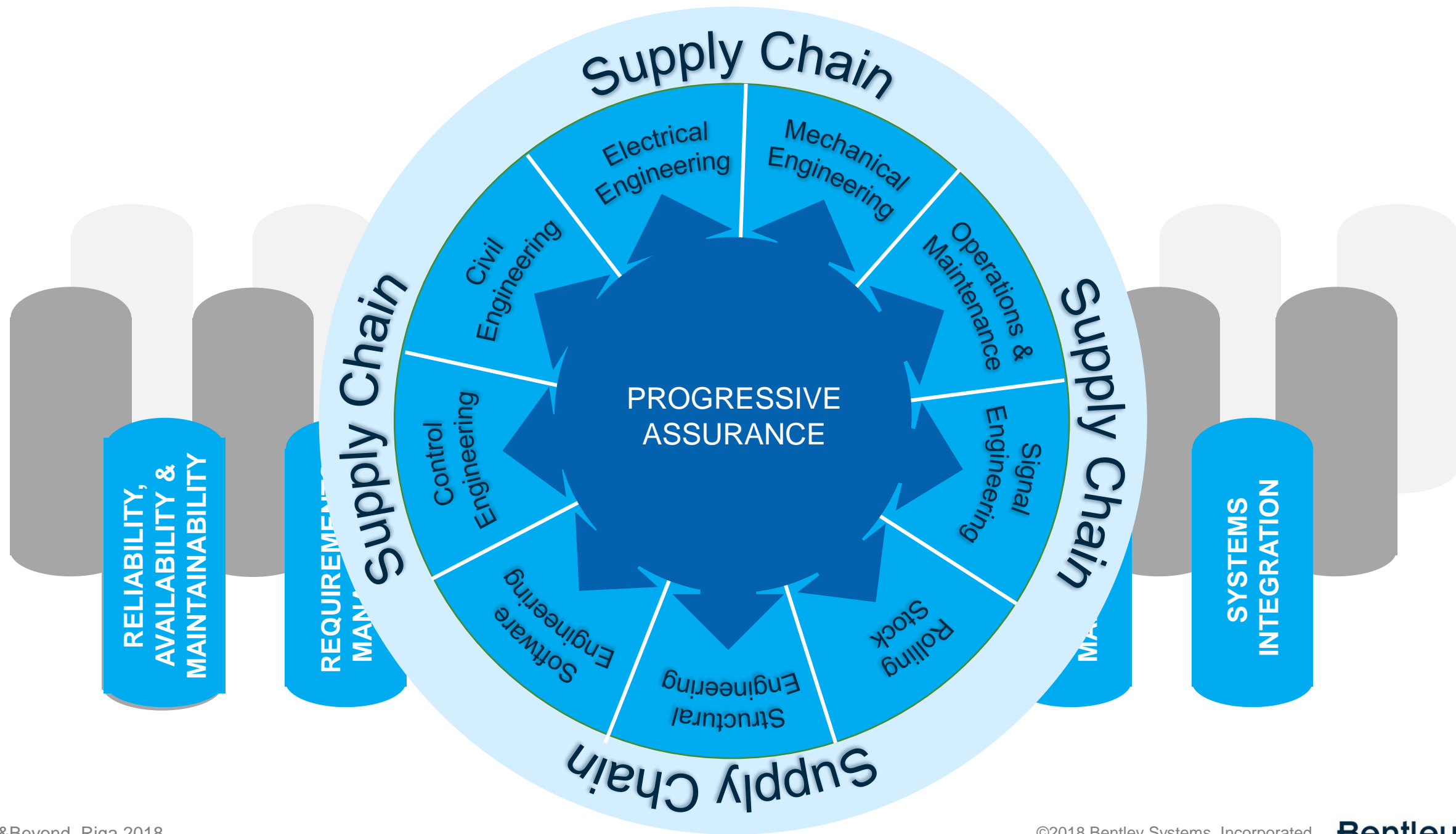
## Digital Components and Workflows



# SYSTEMS ENGINEERING

An interdisciplinary field of engineering and engineering management that focuses on how to design and manage complex systems over their life cycles

- Requirements Engineering
- Reliability, Availability, Maintainability
- Technical & Safety Assurance
- Interface Management
- Systems Integration
- Assumptions Management
- Hazards & Safety Management
- Team coordination and collaboration
- Controls & Approvals Management
- Specification Development
- Competency Management
- Design Verification Management
- Build Validation Management
- Supply Chain Integration
- Compliance Certification Management
- Risk Management
- Change & Impact Analysis
- Issue Management
- Operational Assurance



RELIABILITY,  
AVAILABILITY &  
MAINTAINABILITY

REQUIREMENTS  
MANAGEMENT

Supply Chain

Supply Chain

Electrical  
Engineering

Mechanical  
Engineering

Operations &  
Maintenance

Signal  
Engineering

Rolling  
Stock

Structural  
Engineering

Software  
Engineering

Control  
Engineering

Civil  
Engineering

Supply Chain

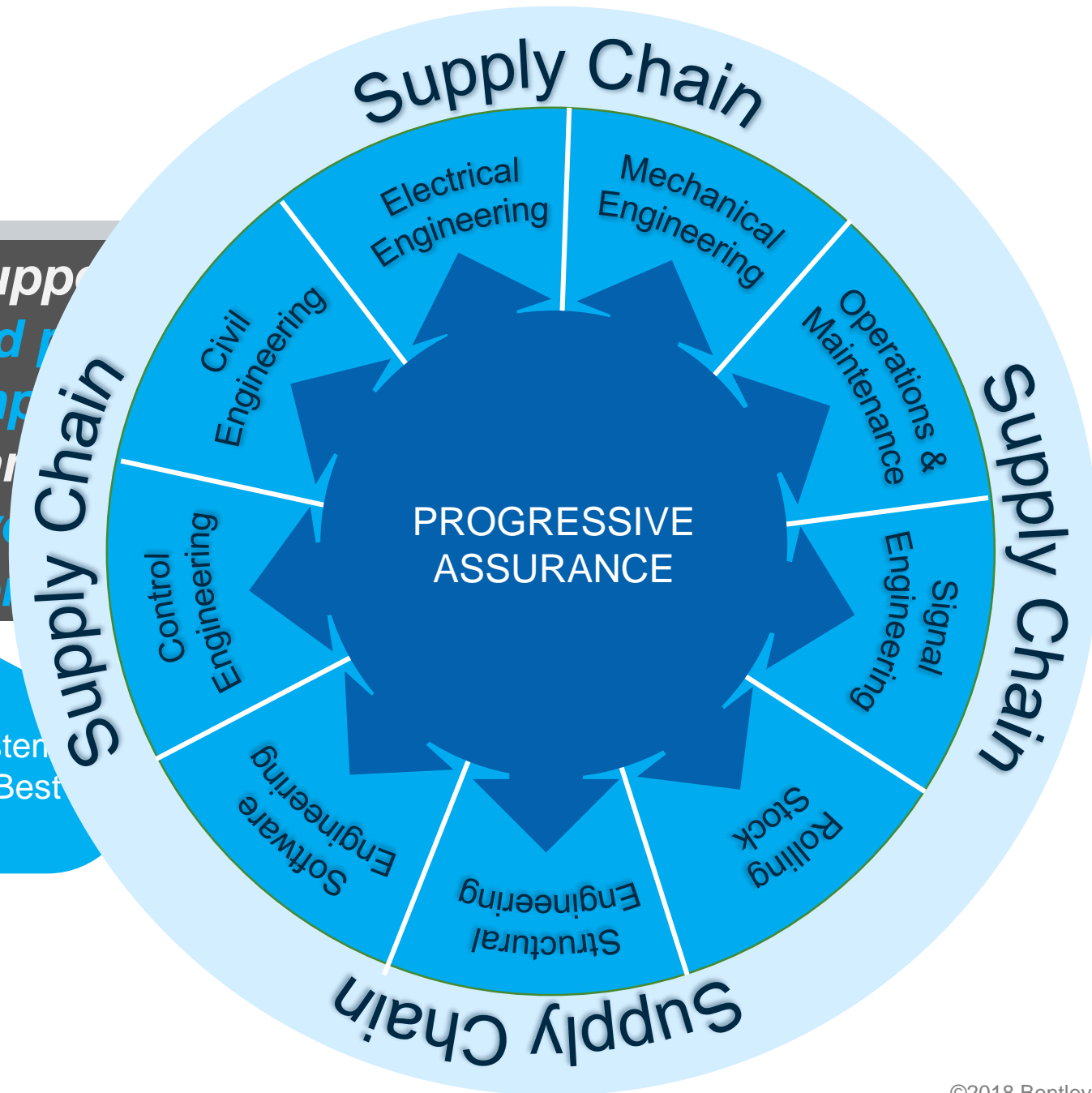
Supply Chain

SYSTEMS  
INTEGRATION

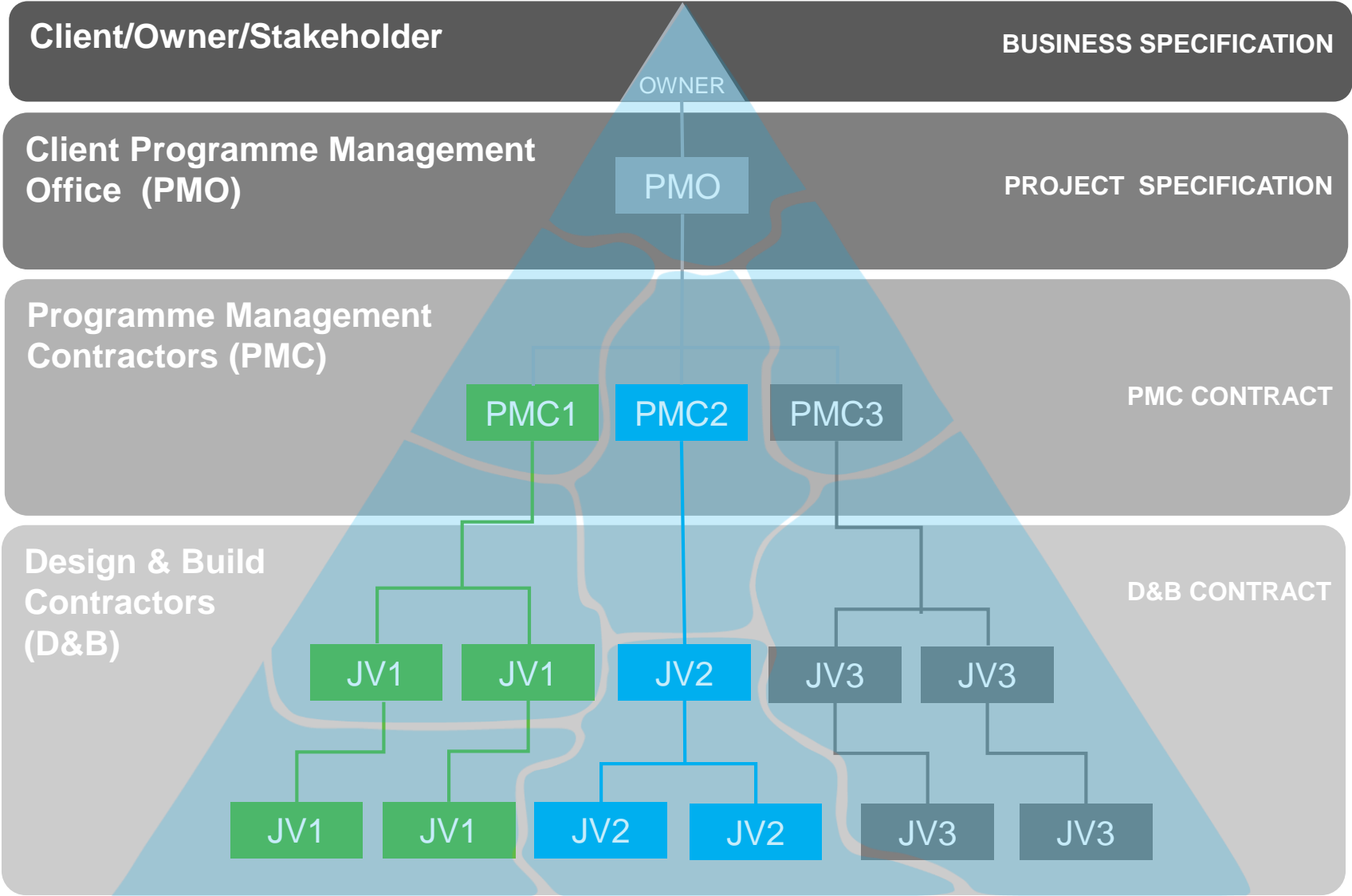


A methodology supporting a series of integrated processes and a toolset (Component Assurance Governance Framework) delivers a program of assurance governance framework

Delivering System Engineering Best Practice

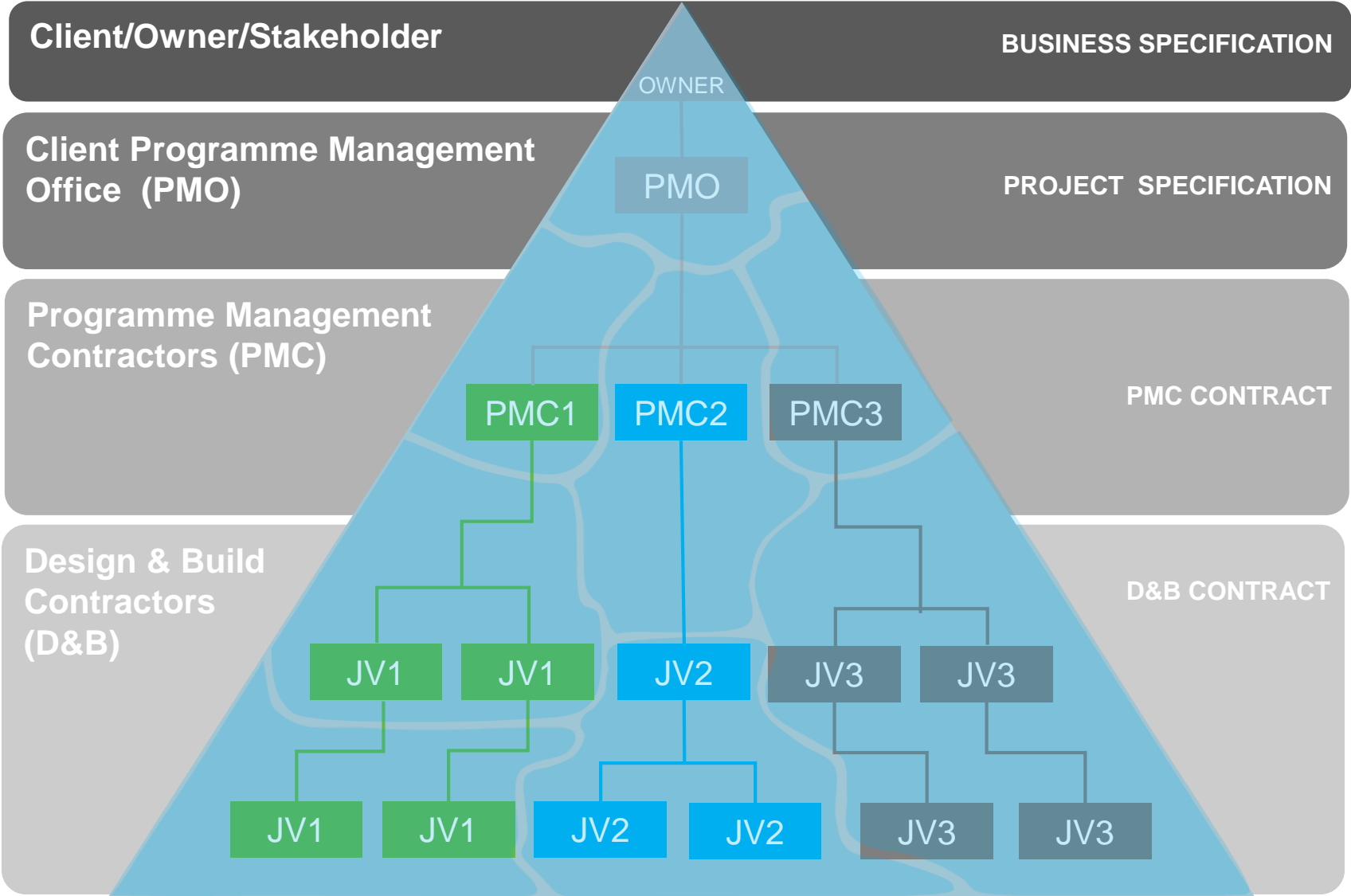


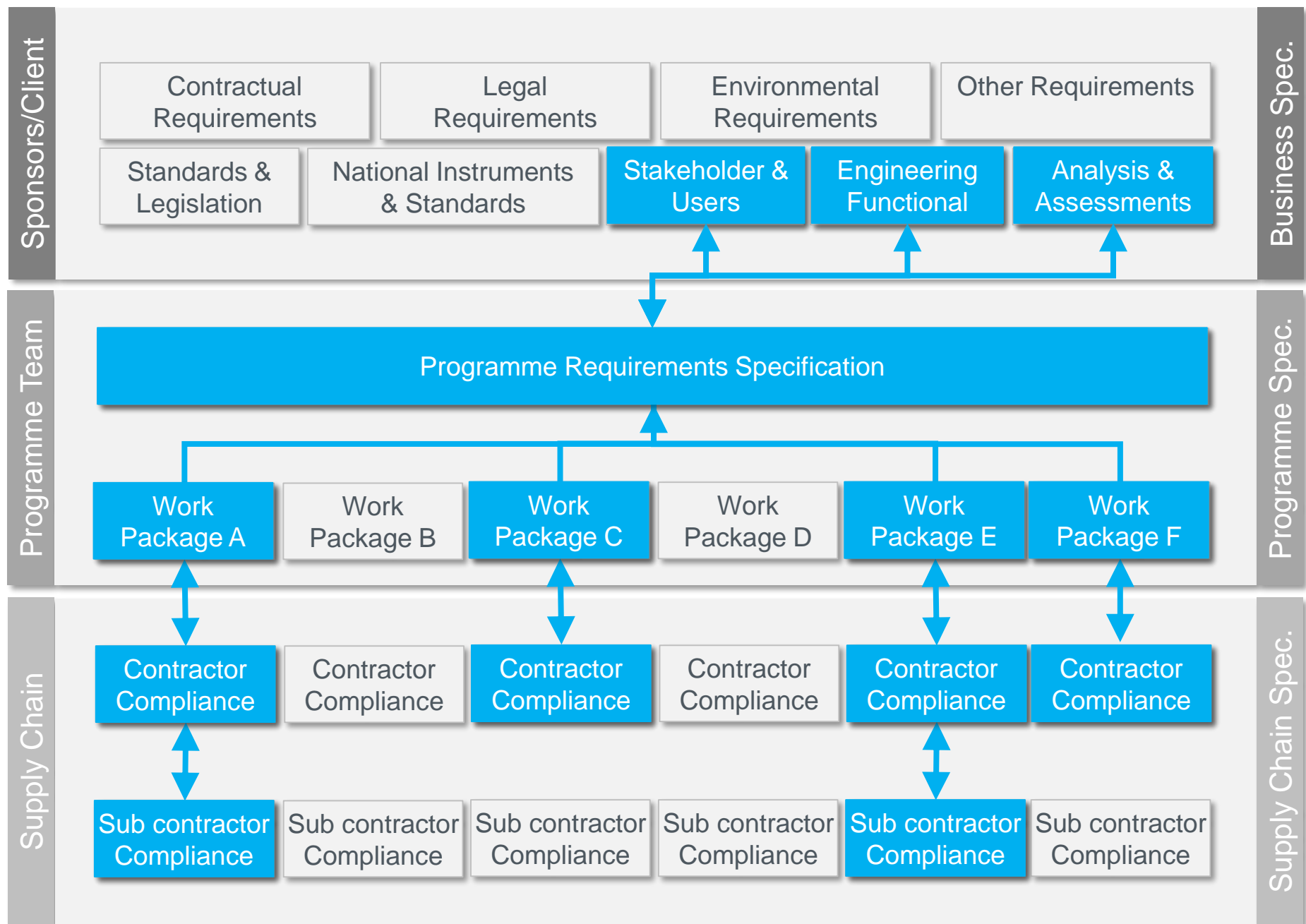
# Progressive Assurance





# Progressive Assurance







Requirements Management | OCTIP Summary | Select

Current Activity: Requirements Management/OCTIP Summary

OCTIP - 12 Rows [Version 7 (latest)]

Badges	Level	Project	Requirement Set	Type	Requirement Status	Verification Progress	Validation Progress
				<div><div>Not Set</div><div>Heading</div><div>Information</div><div>Requirement</div></div>	<div><div>Not Set</div><div>Draft</div><div>Agreed</div><div>Verified</div><div>Validated</div><div>Deleted</div></div>	<div><div>Not Set</div><div>Evidence Awaited</div><div>Evidence Ready</div><div>Evidence Rejected</div><div>Evidence Approved</div></div>	<div><div>Not Set</div><div>Evidence Awaited</div><div>Evidence Ready</div><div>Evidence Rejected</div><div>Evidence Approved</div></div>

Requirements Management

Full-screen Snip

Bentley Area Rapid Transit Authority

Sponsor Level

Programme Level

Project Level

Program Projects

↑

↑

↑

↑

BARTA  
Bentley Area  
Rapid Transit Authority

8

11

15

3

2

10

3

2

10

3

11

OCTIP  
Oakland Center  
Transit Improvement Program

6

9

11

9

2

9

2

11

MPLR  
Mandela Parkway Light Rail

8

10

17

11

6

11

6

17

WOCL  
West Oakland Commuter Line

9

5

22

13

9

22

22

WOSB  
West Oakland Station Build

28

15

55

9

46

55

55

WOSD

5

8

12

12

12

12

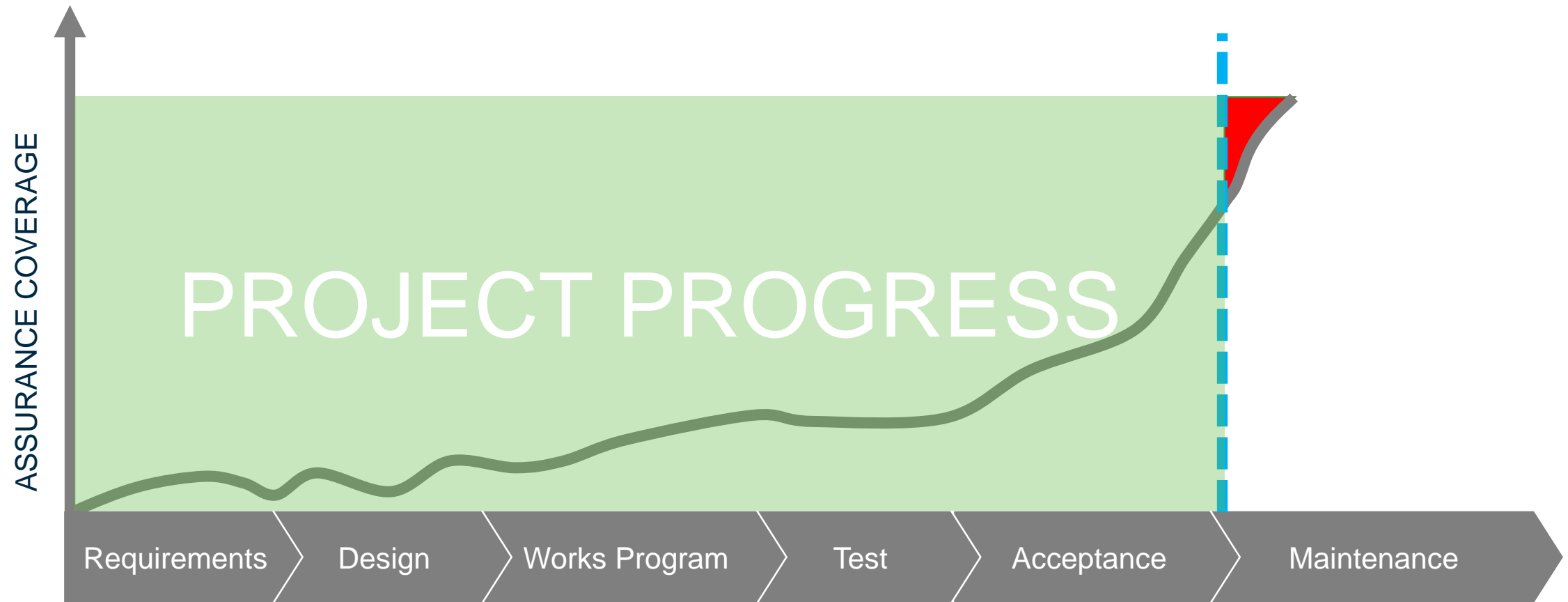
Logged in as Chris Rolison/(Config Managers,PLN Browsers,RQM Editors)

Session 427



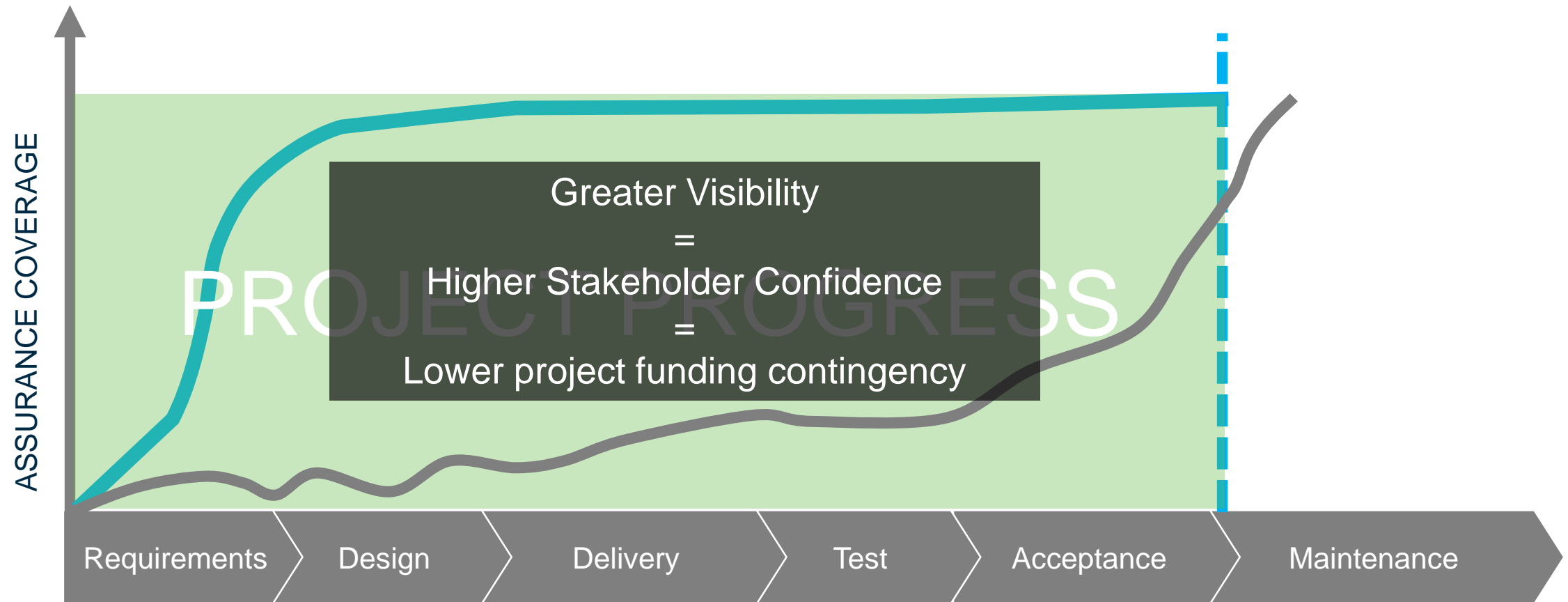
# Conventional v Progressive Assurance

Increases the visibility of risk over whole life of infrastructure



# Conventional v Progressive Assurance

Increases the visibility of risk over whole life of infrastructure



# ComplyPro – Bridging Assurance and BIM

- Typically BIM requirements (EIR) are defined and managed separately from the engineering process and central requirements management
- EIR should be derived from the Sponsor / high level project requirements to ensure;
  - BIM and Assurance are aligned
  - Requirements Management changes are propagated to the BIM model
  - There is no 'lag' between the status of project compliance and the parallel BIM model
- Our 2019/2020 Roadmap will further integrate ComplyPro into the Bentley CDE and align BIM with Assurance...ProjectWise connectivity NOW!
- Bentley believe ComplyPro is the missing 'link' bonding Project Assurance and BIM – a major differentiator in our industry!



# ComplyPro deployment - Cost Benefit Analysis\*

## Progressive Assurance led saving per £100m project unit costs

Tangible Benefits		Saving per £100m
<b>Reduced cost of rework</b>		<b>£3m</b>
	25% saving of £10m project change cost	
<b>Efficiency savings</b>		<b>£4m</b>
	Reduced cost personnel, disputes etc.	
<b>Improved communication</b>		<b>£1m</b>
	Single baseline, assumptions management	
	Continuous progressive assurance	
<b>Operational benefits – Improved Quality</b>		<b>£1m - £3m Annually</b>
<b>= MORE TIME</b>		<b>£IMMEASURABLE!</b>

*\*CBA provided by Carillion Rail – for UK East London Line & North London Line Upgrade Programmes*

# ComplyPro Users include...

## Qatar Rail



Location: Qatar

## Laing O'Rourke



Location: Australia

## banedanmark



Location: Denmark

## Etihad Rail



Location: UAE

## Riyadh Metro



## Crossrail



## Klang Valley MRT



Location: Malaysia

## Wales & Borders



Location: UK





Thank You – Q&A

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