INCOSE

Digital Threads in the Energy Industry

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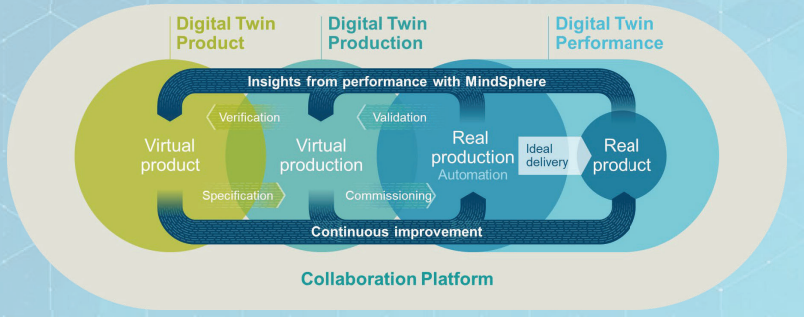
Ed Leggott – Bio

MEng in Systems Engineering – Loughborough University 2009

BAE Systems Graduate Program
F-35 Program → September 2012
- Flight Systems Engineering
- Weapon Systems Engineering
- Configuration Management

Cameron Subsea (**OneSubsea**, Schlumberger)
→ May 2019
- Senior Systems Engineer, Subsea Production Systems
- Engineering Manager, Engineering Digital Lead/Eng Mgmt Office



Siemens Digital Industry Software (DISW)
- Presales Solution Consultant
- Industry TAM (Technical Account Manager)

→ Present

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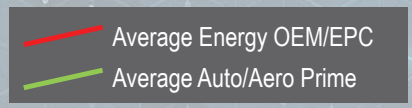
Benchmarking – Energy OEMs/EPCs vs Auto/Aero



Maturity Model	**Concept Phase Activities –** Tendering, Pre-FEED, FEED, Requirmnts, Trade Space Study	**Technical Execution –** Design, Integrated Simulation, Optimization, Engineering	**Non-Technical Execution –** Project Management, Supplier Collaboration, Quality	**Manufacturing Activities –** Planning, Execution Operations, Plant Quality, RT Data Mgt	**Service Lifecycle Mgt –** Maintenance Planning, Spares, Logistics, Support & IOT
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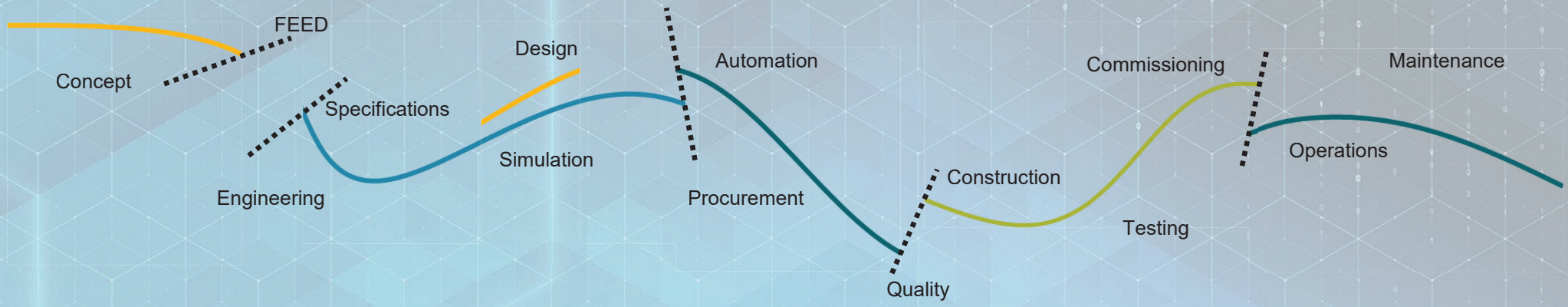
Challenges in the Digital World

Digital Thread concept is *supposed* to enable cross-domain communication



- Organizational structure tends to break up the lifecycle
- Digital tools usually disconnected, or even absent
- Communication issues stem from the need to conduct manual handovers between people within a non-standard process
- No trust from the Supply Chain to properly share data during E/P/C stage
- No true “Digital Twin” of the asset is achievable

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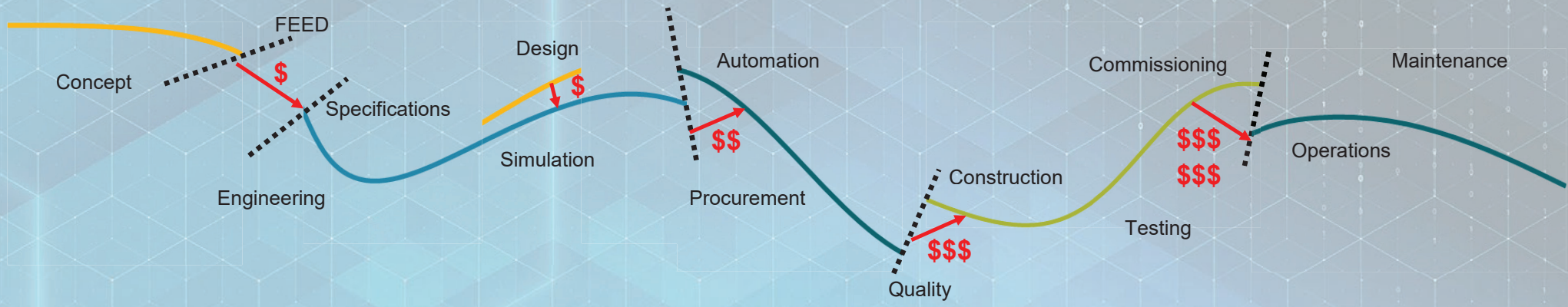

- Risks of unknown run 10%-15% contingency margin for all parties
- Schedules have +30% hidden float as standard
- Cost of change exponentially increases the further right you get
- Escalating CYA costs passed down the Supply Chain have moved the industry towards Brown Field instead of Green Field investments

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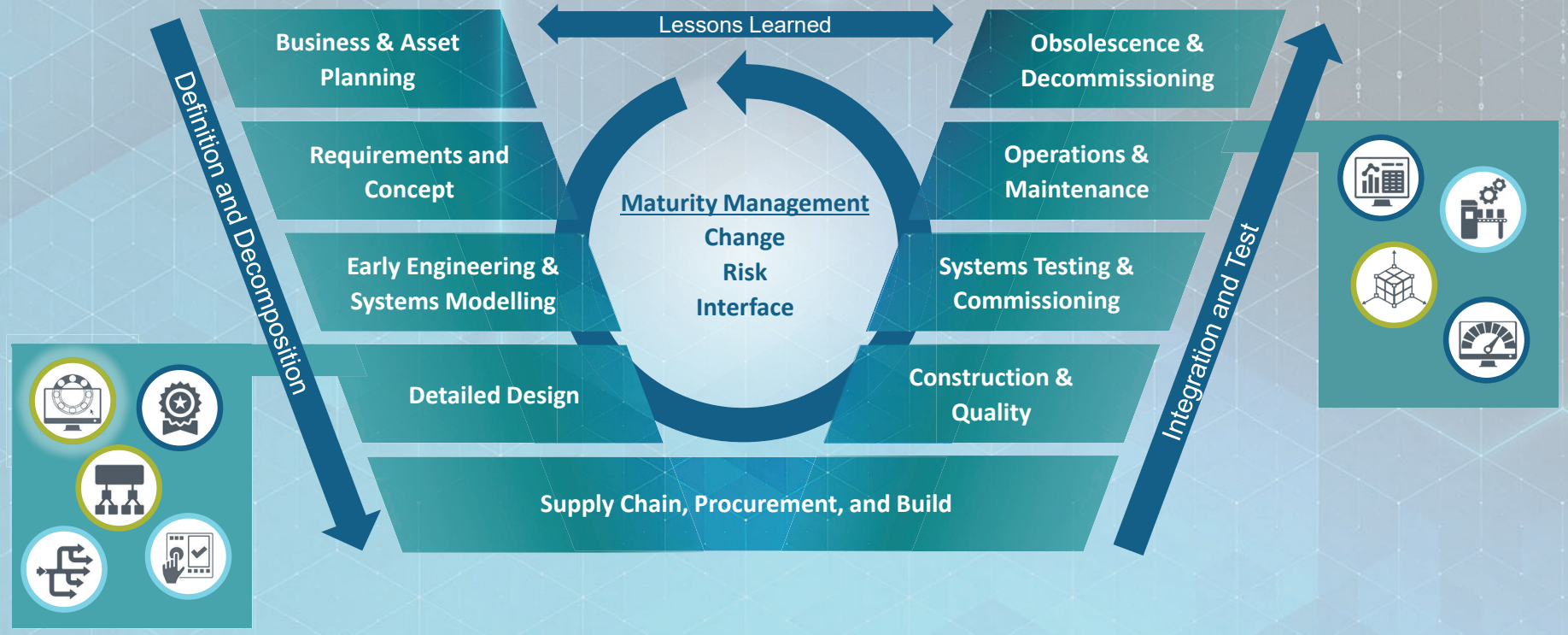
Organization Information Flow vs Solutions



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Organization Information Flow vs Solutions

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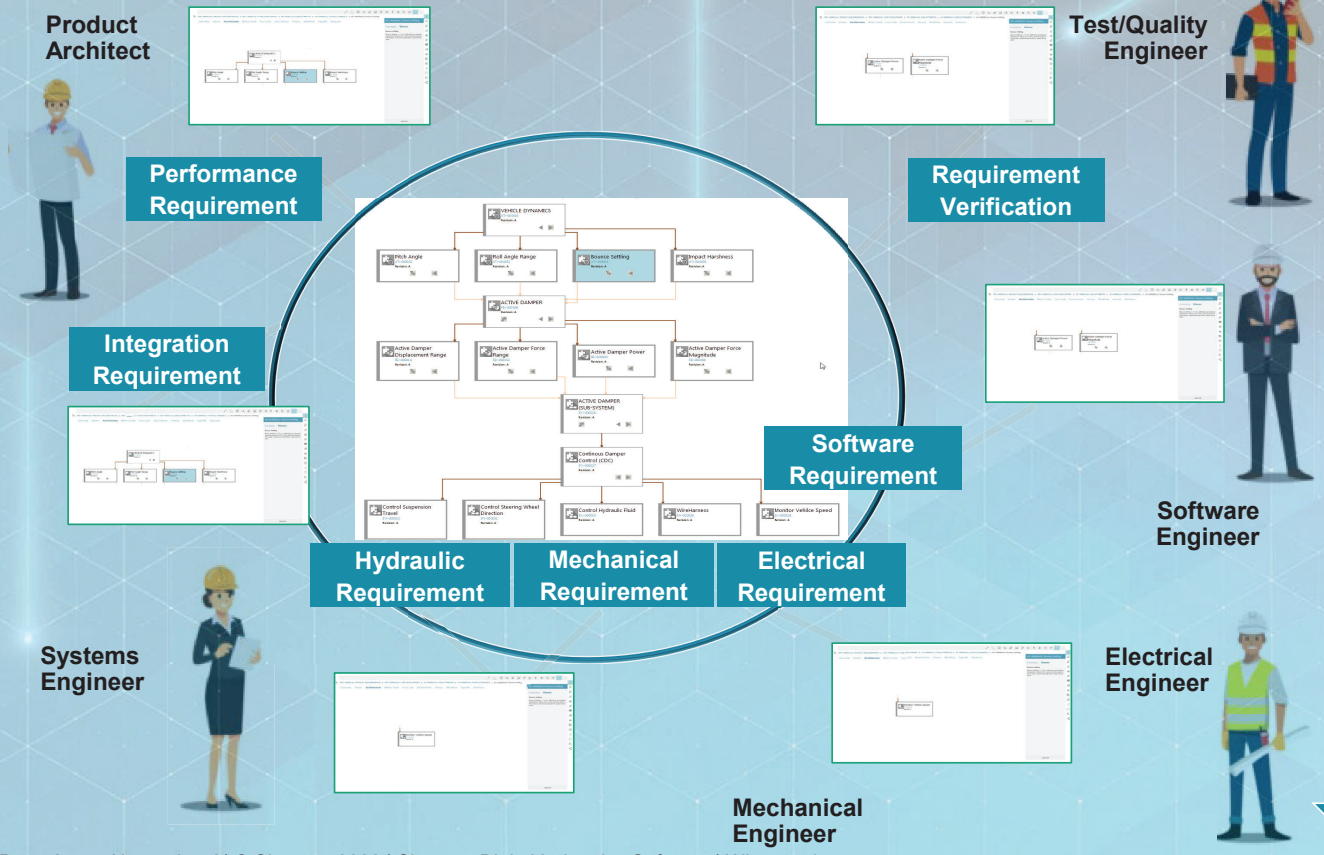
Multi-domain requirements



ACROSS DOMAINS

- Integrated Requirement to Domains
- Create Engineering Views
- Impact Analysis Requirement Change Orchestration
- Traceability In Context Requirement Configuration
- Integrate Multi-Sources

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Digital Threads tell stories

By Lifecycle (Silo)

- Concept Design, FEED, Upfront Decision Making, Contract Award
- Project Execution Fundamentals: Technical/Non-Technical, Customer/Supplier
- Manufacturing/Construction Planning and Execution
- Operational Excellence, Minimize Downtime, Maximize Performance

By Portfolio (Siemens)

- Digital Lifecycle Excellence
- Advanced Engineering Simulation
- Integrated Design & Configuration
- Operational Excellence

By Industry/Company

- Owner/Operator/Producer
- Utilities
- EPC/AES
- OEM
- OFS
- Engineering House
- Renewables/Hydrocarbon
- Upstream/Midstream/Downstream
- Commodities

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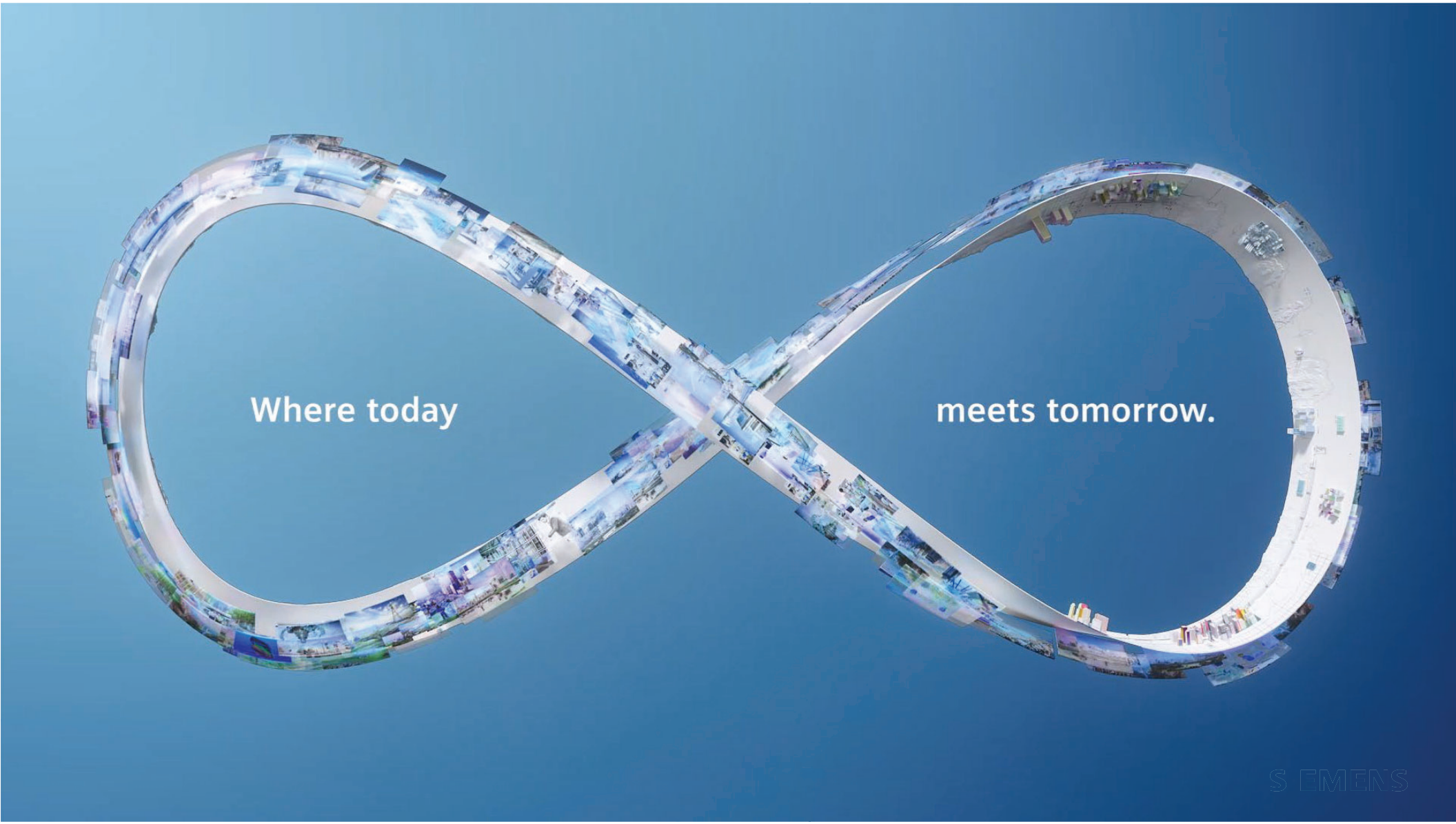
Where today
meets tomorrow.
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Logic/Decision Making History lost to time

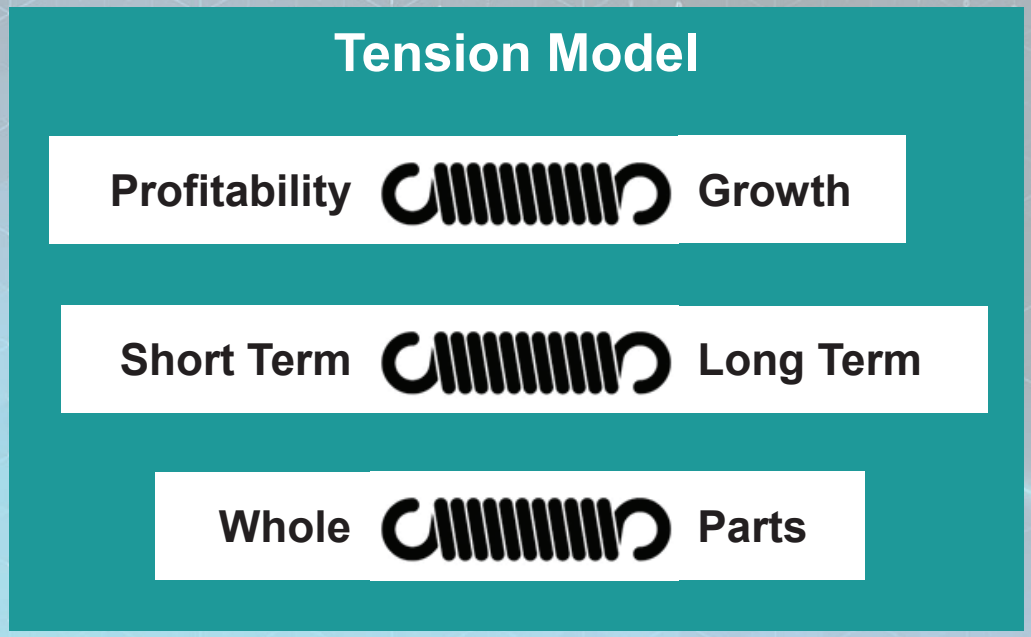
Why did we make this decision?

Let's research it:

- Jim retired last year
- Vendor documentation unclear
- Lessons Learned database not consistent
- No recorded meeting/minutes
- It happened before the re-org

Conclusion: **WE DON'T KNOW**

Let's make a new decision….



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What is your Strategy??

Typical “Strategies”
- More Revenue
- Higher Margin
- Increased Safety
- Lower Risk
- More Automation
- Digital Twin
- Deliver On-Time
- Lower NPT
- More Agile

This is “WHAT” you want to achieve in a marketing/shareholder friendly statement

This is “WHAT” you want to achieve

Start here, admit what they really are. Identify tension, recognize silos

This is “HOW” you plan to achieve your Objectives

Ask your leaders the “HOW”… uncomfortable gaps are OK, because it presents an opportunity

This is “HOW” you plan to support your Strategy(ies)

Do your research, prove the concept, model the ROI, show the value, configure vs customize etc

This is “WHAT, WHEN, WHO” you will do to achieve ***any*** of the above

Pull the trigger…
Everyone can have a role
Everyone can be successful!

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Solution Roadmap

How can you create a Digital Ecosystem across the solutions required to bring your asset online?

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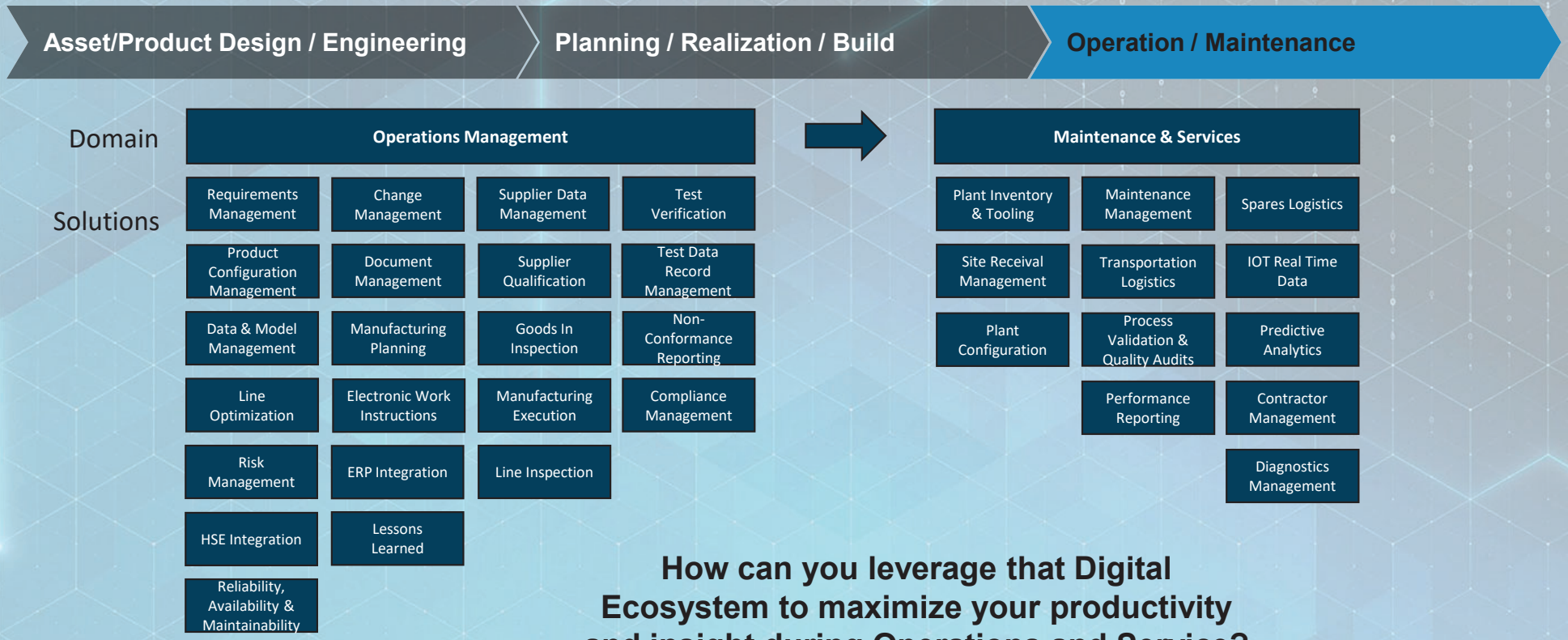
Solution Roadmap



How can you leverage that Digital Ecosystem to maximize your productivity and insight during Operations and Service?

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DON'T FORGET!
Digital Adoption Strategy

End User successful adoption

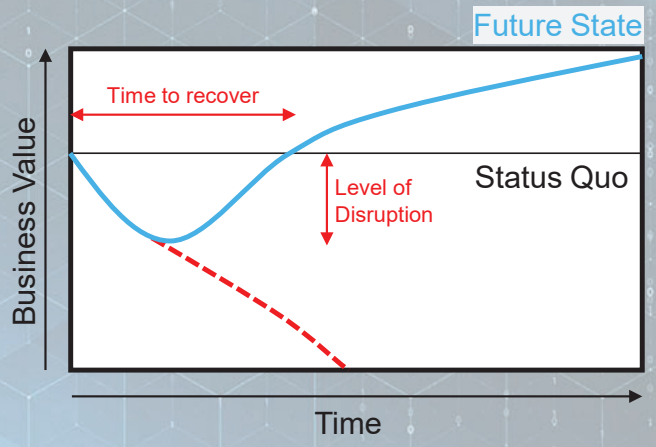
Learning and performance support
Content development, mentoring, tools and technology

Communication planning
Effective execution of communication activities

Sponsor/Ambassador identification and management
Support plan for ambassadors and high-level audience analysis

Executive Management Team support and communication
Involved with all communications at every level affected by the events

"70% of digital transformations fail due to a lack of user adoption and behavioral change"



Adoption is not just Training… It is the Definition of Success

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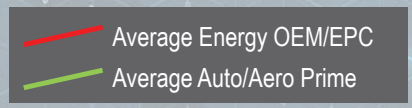
Where are you today?
Where do you want to be in the future?



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Q&A

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