

BCA Strategic Data Standards

Brian Chiesi

Director of Business Capability
Integration

The Boeing Company
September 29, 2015

GLOBAL PRODUCT DATA INTEROPERABILITY **SUMMIT** 2015



ELYSIUM

Darker Aerospace

NORTHROP GRUMMAN

BOEING

ELYSIUM

Darker Aerospace

NORTHROP GRUMMAN

BOEING

Biography: Brian Chiesi

Global Product Data Interoperability Summit | 2015

- **2012 - Present: Director of Business Capability Integration within the Business Capability organization for Boeing Commercial Airplanes in Bellevue, WA. Leads the Integration team in support of the current and future Business Capability requirements**
- **2009 – 2012: Senior Manager for the Development Program Excellence (DPE) Initiative, responsible for improving development program success**
- **2007 – 2009: Senior Manager for S&IS Engineering Tool Strategy, developed and deployed common tools and processes throughout S&IS Engineering. Lead and participated in various IDS level initiatives.**
- **1989 – 2007: Supported the Rotorcraft Division in Ridley Park, PA in a variety of capacities:**
 - **Functional Manager for Airframe Design and Integration**
 - **Sr. Manager for Rotorcraft Engineering Support Services**
 - **Chief Engineer for Bell-Boeing 609**
 - **Assembly and Integration Team Sr. Manager on V-22 and CH-47G,**
 - **Product Team Manager for BCA Support. Developed and deployed concurrent product definition tools and processes within 777, V-22 and Chinook programs.**
- **1983 – 1989: Worked as Structural Composite Designer in Advanced Systems on the B2 program**
- **1980 – 1983: Joined Boeing in the Puget Sound as a Structural Design Engineer on the 767 and 737-300 programs**
- **Brian attended West Virginia University where he received a Bachelor of Science in Civil Engineering. Brian has been married to his wife, Debbie, for 30 years and lives in Bothell, WA.**

Boeing Commercial Airplanes

Our Products

Global Product Data Interoperability Summit | 2015



737



747



767



777



787



Commercial
Aviation Services

Approximately How Many Parts Are On a Boeing 787?

Global Product Data Interoperability Summit | 2015

- A. 400,000
- B. 1,200,000
- C. 2,300,000
- D. 10,000,000



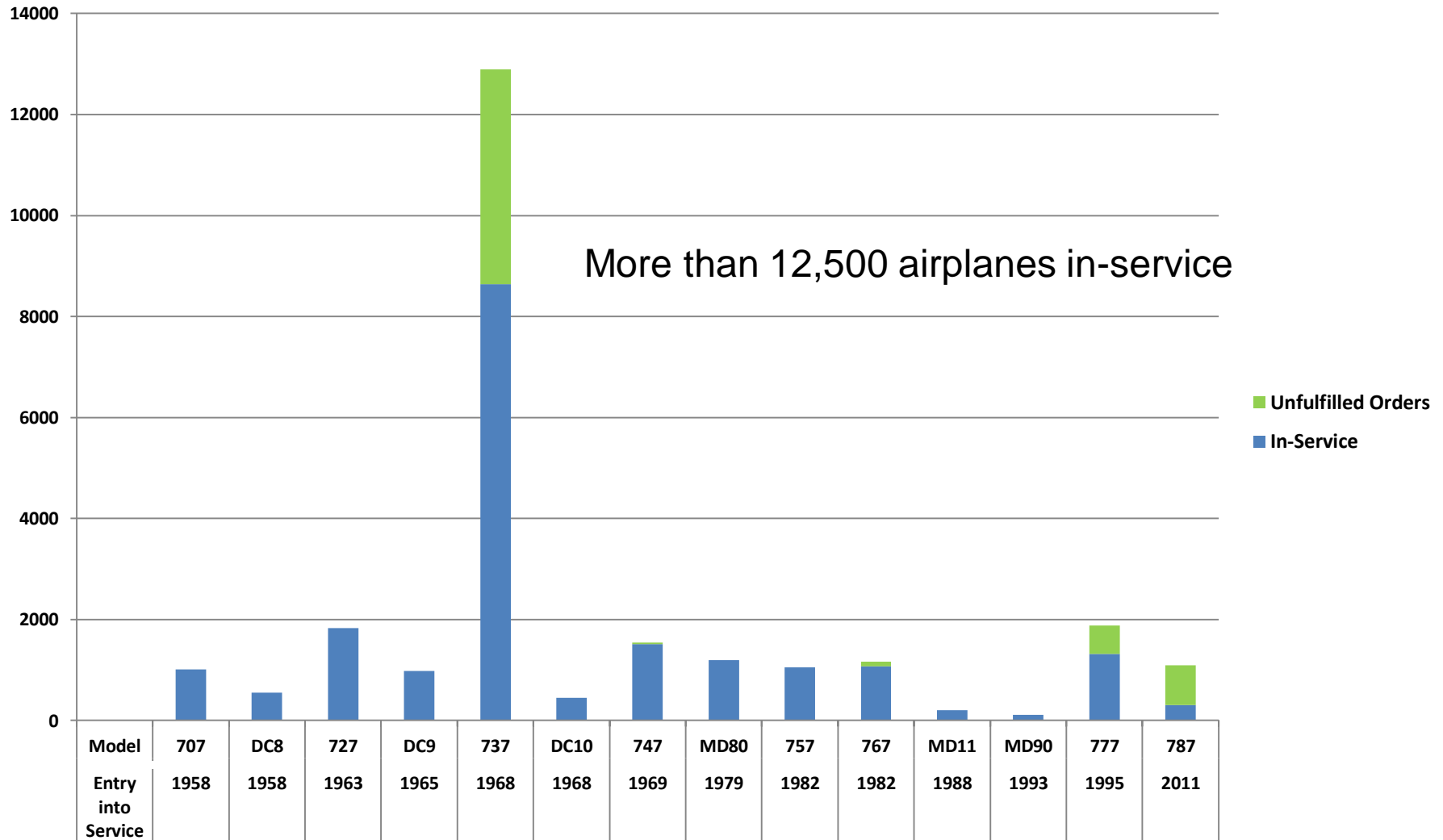
Boeing Commercial Airplanes Annual Product Build

Global Product Data Interoperability Summit | 2015

Model	2014 Build	Parts per A/P	Parts Managed
737	485	394,000	191,090,000
747	19	10,000,000	190,000,000
767	6	3,100,000	18,600,000
777	99	3,000,000	297,000,000
787	114	2,300,000	262,200,000
Total	723		958,890,000

In Service Fleet Product Data Must Be Retained For The Life Of The Type Design

Global Product Data Interoperability Summit | 2015



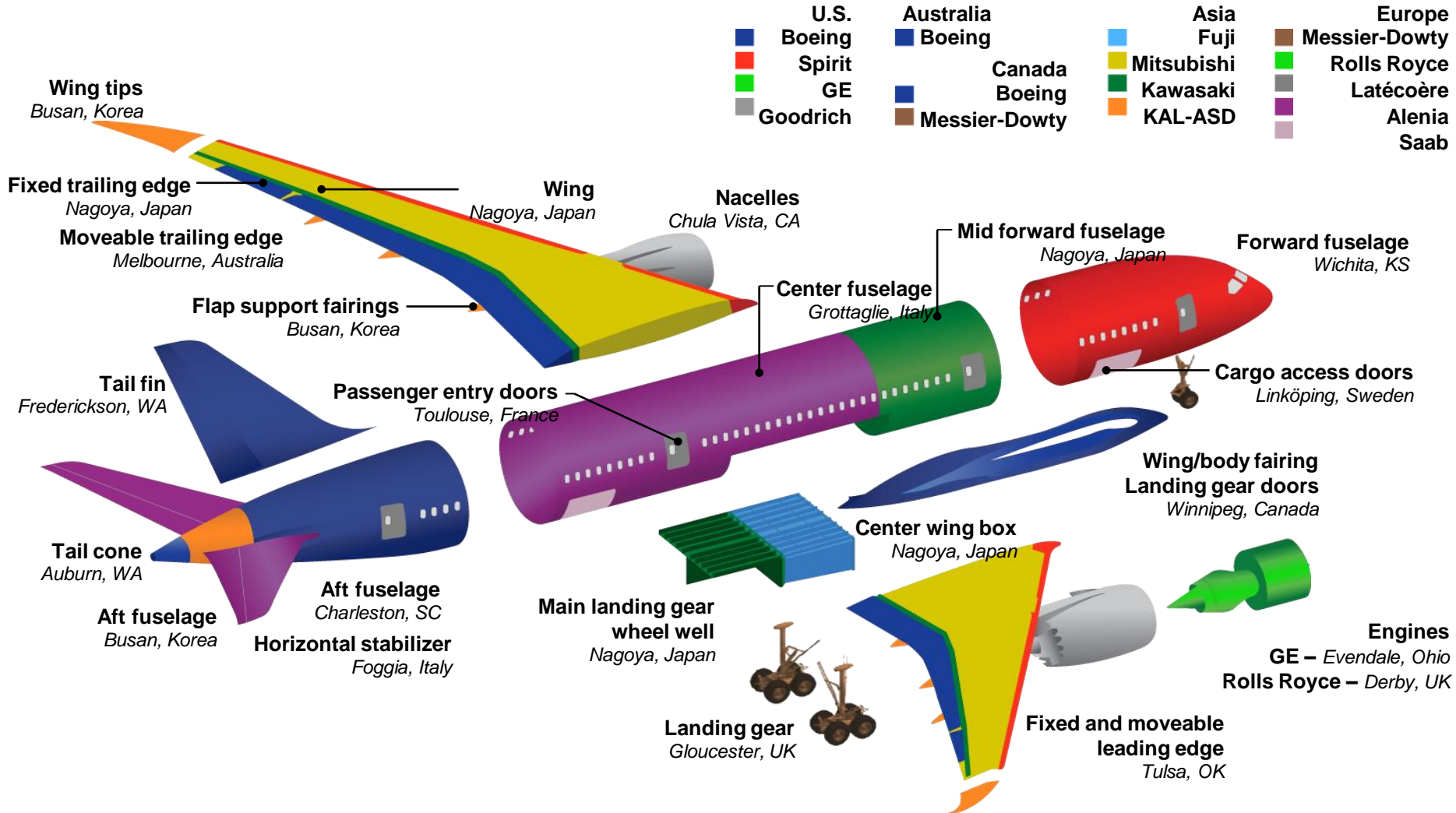
Boeing Commercial Airplanes Global Extended Enterprise

Global Product Data Interoperability Summit | 2015



Global Partners Bring the 787 Together

Global Product Data Interoperability Summit | 2015



Boeing Information Technology Organization Top Ranking Technology Innovator

Global Product Data Interoperability Summit | 2015

Product Systems

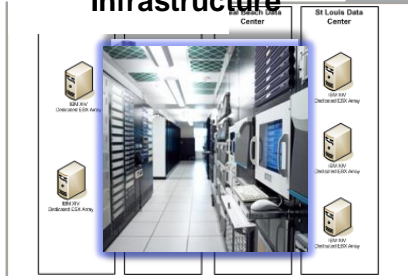


2,500 production web sites
750 classified programs supported
63 million e-mails managed monthly
10,000 companies use our Supplier Portal
300,000 malware attacks blocked monthly

International



Infrastructure



Over **200 million** spam messages filtered each month
300,000+ employees, contractors, suppliers, customers and retirees access Boeing systems each day

Information Security



One of the **largest private intranets** in the world

8.5 million teleconference users annually

8,500+ systems

Business Partners

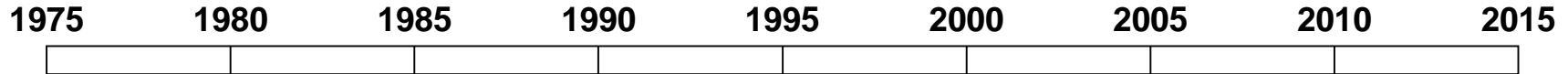


Business Systems

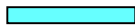


Boeing Major Airplane Development Launch to First Flight

Global Product Data Interoperability Summit | 2015



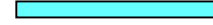
757



777



787



767



737 NG



Osborne 1



iPhone 7

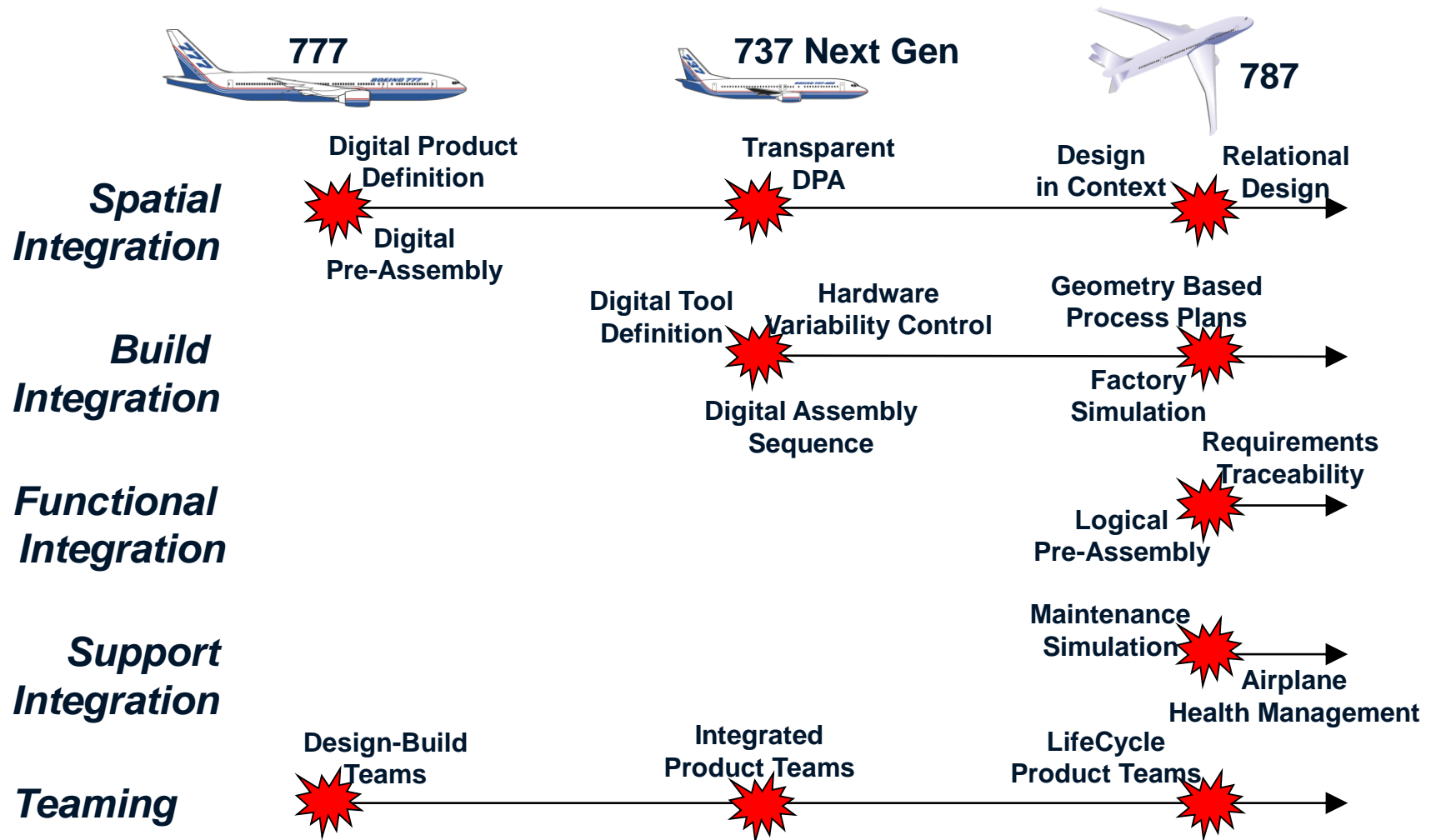


1/100th the weight
100 times processing clock frequency
1000 times processing memory
1/10th the cost adjusted for inflation

10⁶ x Computing Power Per Dollar Improvement

Virtual Product Development Evolution

Global Product Data Interoperability Summit | 2015



PLM Evolution at BCA

Global Product Data Interoperability Summit | 2015

Gen 0 1960-1990

- 2D Drawings
- Physical Mock-up
- Forms based data entry
- Explicit airplane configuration
- Boeing built applications
- Mainframe systems

Gen 1 1990-Present

- 3D model +2D Drawings
- Spatial Pre-assembly
- Teamcenter Enterprise PDM
- Configuration by Option
- Customized COTS + Boeing Applications
- UNIX transitioned to Windows systems

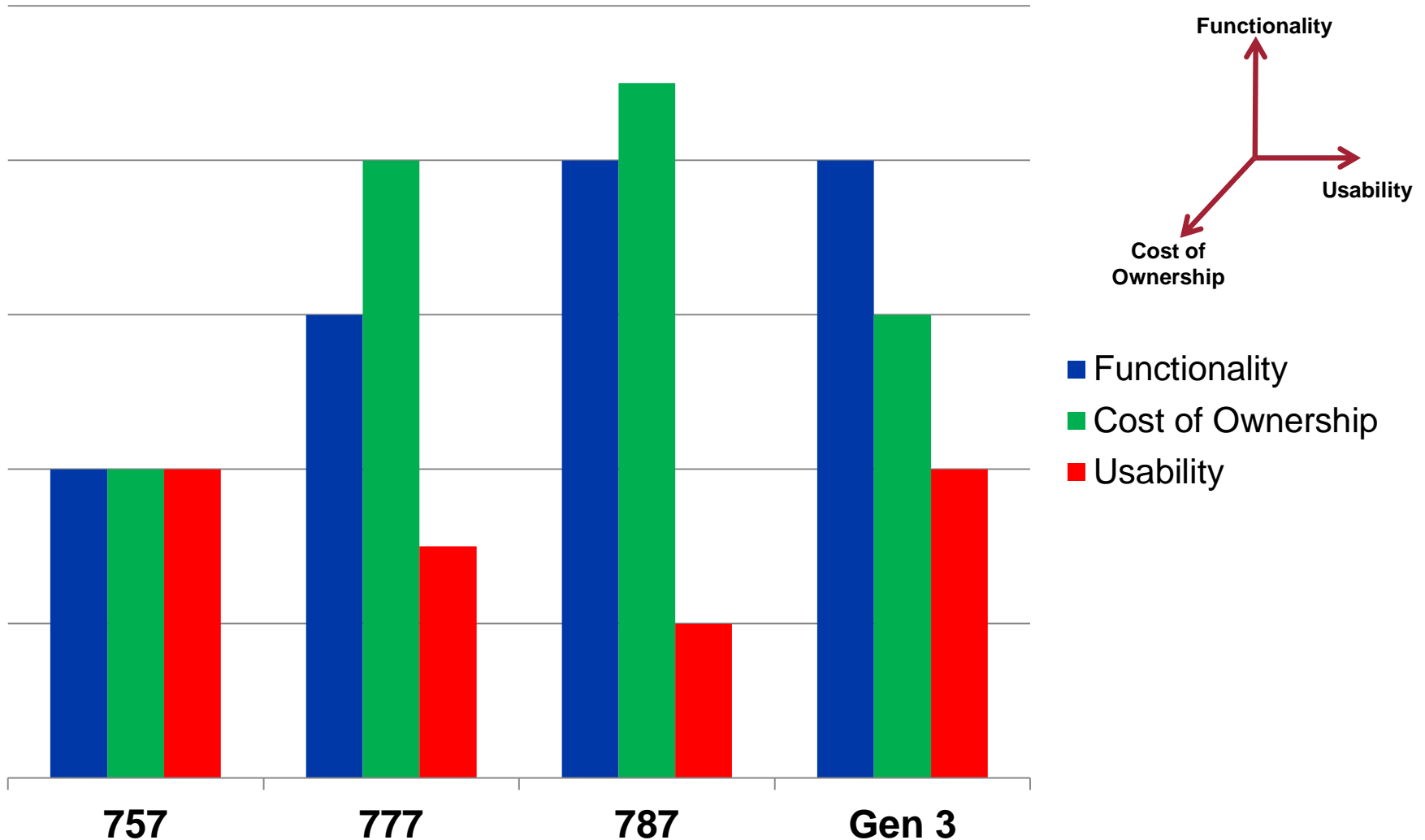
Gen 2 2005-Present

- 3D Model Based Definition
- Spatial, Functional, Build & Support Pre-assembly
- Dassault Systemes V5 PLM
- Instance based configuration by option
- Customized COTS + Boeing Applications
- Windows systems

Gen 3 2015-?

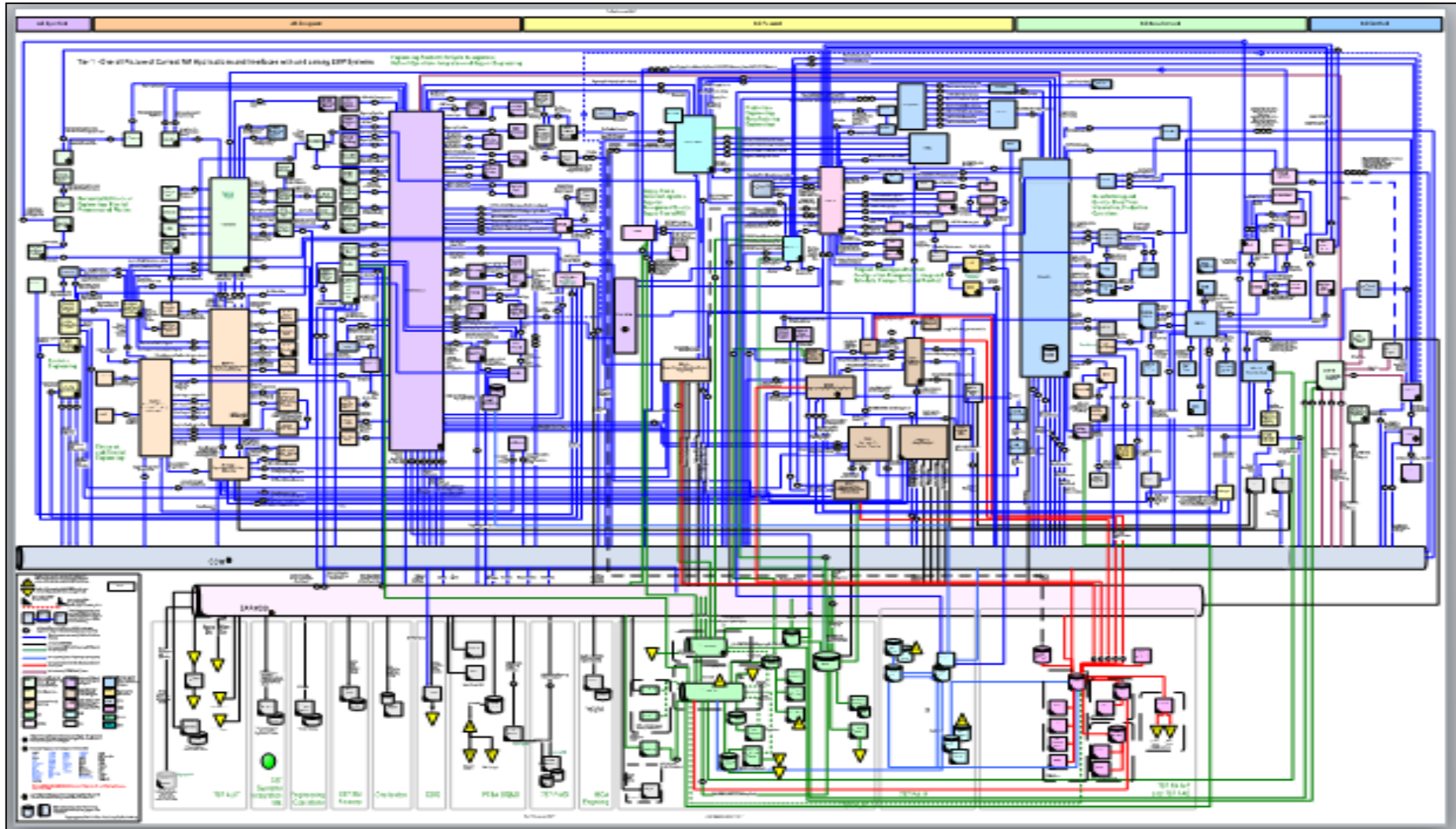
Desired Future PLM Value for BCA

Global Product Data Interoperability Summit | 2015



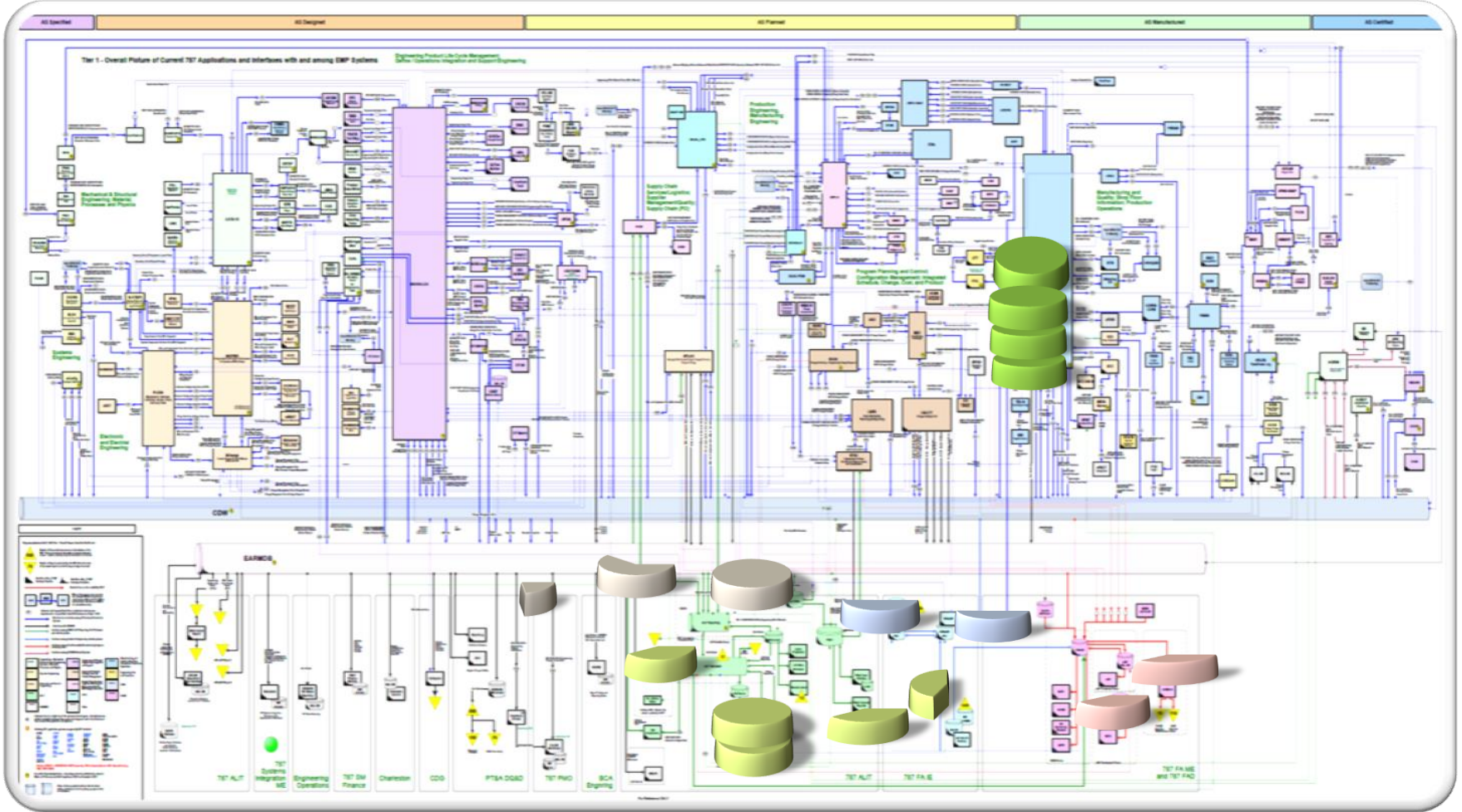
BCA System of Systems (As Is)

Global Product Data Interoperability Summit | 2015



Data Replication: An Increasing Burden

Global Product Data Interoperability Summit | 2015



One authored Master Database and 12 full / partial replications

Technology Convergence – Our Challenge

Global Product Data Interoperability Summit | 2015



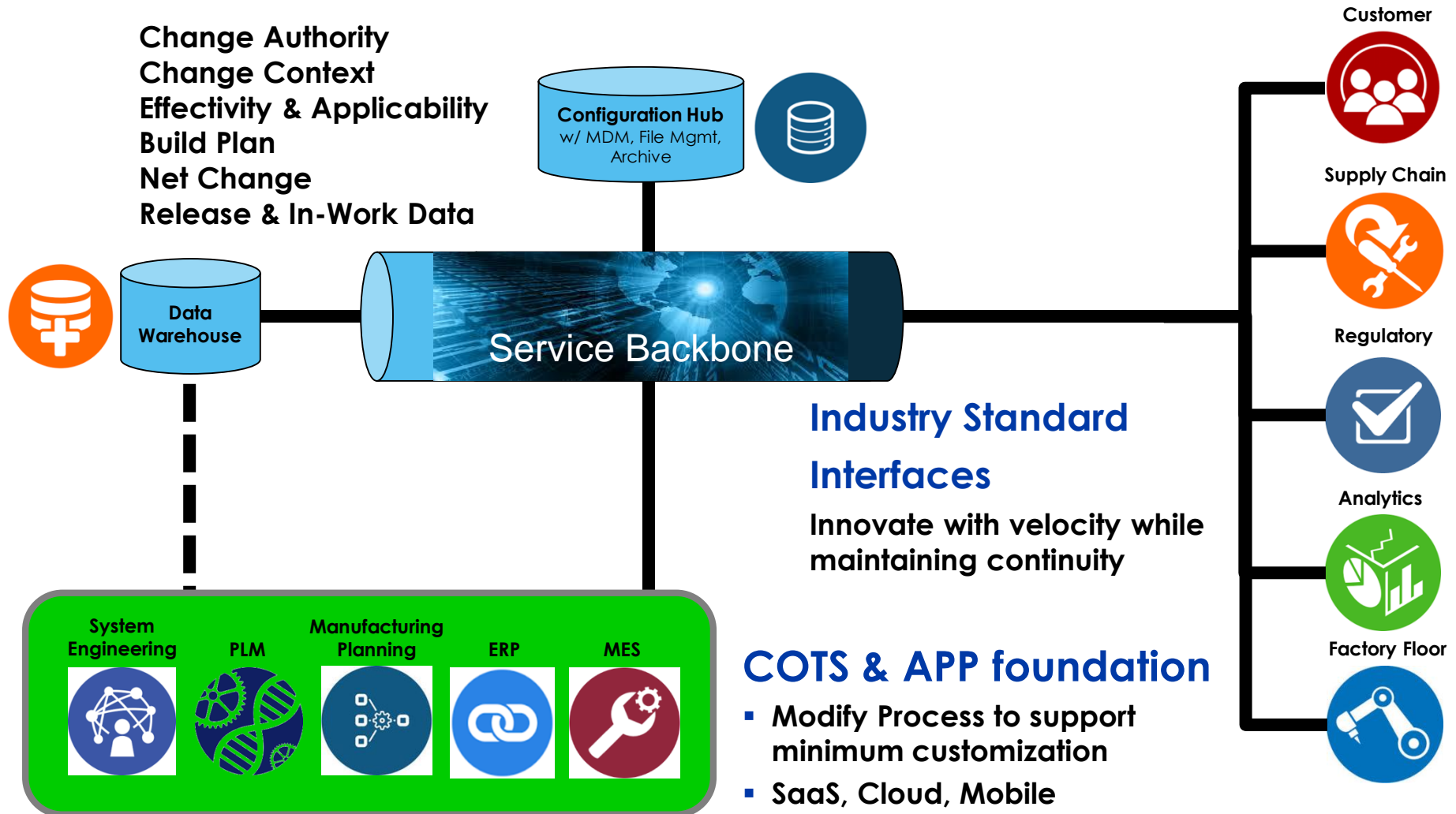
- **SMAC**
(Social, Mobile, Analytics, Cloud)
- **Automation**
- **Robotics**
- **Miniaturization**
- **Sensors**
- **Etc.**



Architect a system that enables rapid technology insertion

Future Architecture Solution Concept

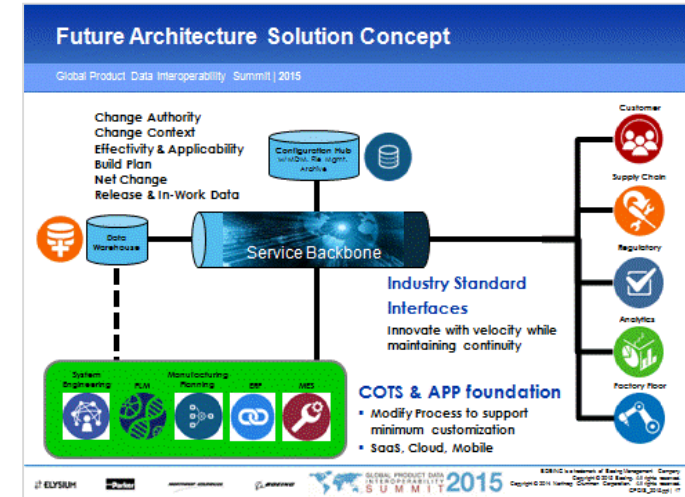
Global Product Data Interoperability Summit | 2015



Business Capabilities 2020 Key Requirements

Global Product Data Interoperability Summit | 2015

- Smart User Interface
- Information Centric
- Obsolescence resilient
- Analytics Driven
- Incrementally Deployed
- Standards Compliant
- Globally Available
- Technology enabling



Architecture enabling Boeing's 2nd Century Capabilities

Position Statement

Global Product Data Interoperability Summit | 2015

- **Single set of interoperable standards**
- **Minimum redundancy**
- **Support harmonization**
- **Fully open based on ISO STEP**
- **Become a contractual requirement**
- **Adopt interim standards to fill gaps**
- **Lead development and adoption**

Position Statement

Global Product Data Interoperability Summit | 2015

1. BCAt requires a harmonized suite of data standards that covers the Product lifecycle. The data standards are the basis of a stable, vendor independent, interoperable data exchange interface between applications and organizations across Boeing, the A&D industry and essential for LOTAR.
2. The suite should minimize redundant data definitions across standards, i.e. there is a single consistent standard representation for data content but allowing for multiple implementation techniques.
3. Boeing will proactively support efforts to harmonize standards that provide strategic value.
4. The suite of standards will be based on the ISO STEP standards (ISO 10303) augmented by other fully open (IP owned by a standards organization, no IP limitations, level playing field) standards.
5. It is the intent of BCAt to add contractual requirements to contracts with Software vendors. The language will require that vendors support the entire suite of A&D data standards with the same level of fidelity as their own proprietary formats.
6. Boeing may adopt or define an interim standard where an industry standard is unavailable. It is the intent to adopt the industry data standard when available, mature and affordable.
7. Boeing will be an Industry Leader in information standards development and adoption.

ELYSIUM Parker NORTHROP GRUMMAN BOEING GLOBAL PRODUCT DATA INTEROPERABILITY SUMMIT 2015 BOEING is a trademark of Boeing Management Company. Copyright © 2015 Boeing. All rights reserved. Copyright © 2014 Northrop Grumman Corporation. All rights reserved. GPDIS_2015.ppt | 19

Benefits

Global Product Data Interoperability Summit | 2015

- **Minimize customized applications and maximize COTS capabilities**
- **Break the obsolescence cycle**
- **Minimize cost of integration and data migration**
- **Enable future technologies**

Summary

Global Product Data Interoperability Summit | 2015

- **Highly customized unique program solutions are too costly, complex and rigid**
- **Architectures are required to support**
 - Rapid changes in business environments
 - Emerging technologies
 - Business information analytics
- **How do we get there**
 - Information centric and application agnostic architectures
 - Harmonized, open data standards
 - COTS based capabilities
- **Boeing, as an A&D industry leader, will help lead the development and adoption of industry data standards**



Position Statement (RevNew)

Global Product Data Interoperability Summit | 2015

1. BCA requires a harmonized suite of data standards that covers the Product lifecycle. The data standards are the basis of a stable, vendor independent, interoperable data exchange interface between applications and organizations across Boeing, the A&D industry and essential for LOTAR.
2. The suite should minimize redundant data definitions across standards, i.e. there is a single consistent standard representation for data content but allowing for multiple implementation techniques.
3. Boeing will proactively support efforts to harmonize standards that provide strategic value.
4. The suite of standards will be based on the ISO STEP standards (ISO 10303) augmented by other fully open (IP owned by a standards organization, no IP limitations, level playing field) standards.
5. It is the intent of BCA to add contractual requirements to contracts with Software vendors. The language will require that vendors support the entire suite of A&D data standards with the same level of fidelity as their own proprietary formats.
6. Boeing may adopt or define an interim standard where an industry standard is unavailable. It is the intent to adopt the industry data standard when available, mature and affordable.
7. Boeing will be an Industry Leader in information standards development and adoption.

What makes computing systems usable?

Global Product Data Interoperability Summit | 2015

Usable systems:

- Are designed around how users prefer to work
- Follow conventions and feature consistent interfaces
- Are consistent with other tools a user must use
- Provide users a sense of what to do next
- Help users avoid errors
- Do not rely on user's memory to find things
- Have elegant interfaces, free of extraneous tools
- Allow users to customize the interface
- Use terminology users understand



References:

Molich, R., Nielsen, J. (1990) Improving a Human-Computer Dialogue: What Designers Know about Traditional Interface Design."

Communications of the ACM 33. March.

Usability.gov (2012).