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LIVEWORX

A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

SESSION ID: PL1403C

HOW LOCKHEED MARTIN STREAMLINED THEIR DIGITAL THREAD WITH ZUKEN & PTC

LOCKHEED MARTIN

ZUKEN

SPEAKER(s):

Grant Denis
Lockheed Martin

Joe Richlen
Zuken USA Inc.

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LOCKHEED MARTIN

LOCKHEED MARTIN PROBLEM DEFINITION

Grant Denis
Lockheed Martin

May 17th, 2023

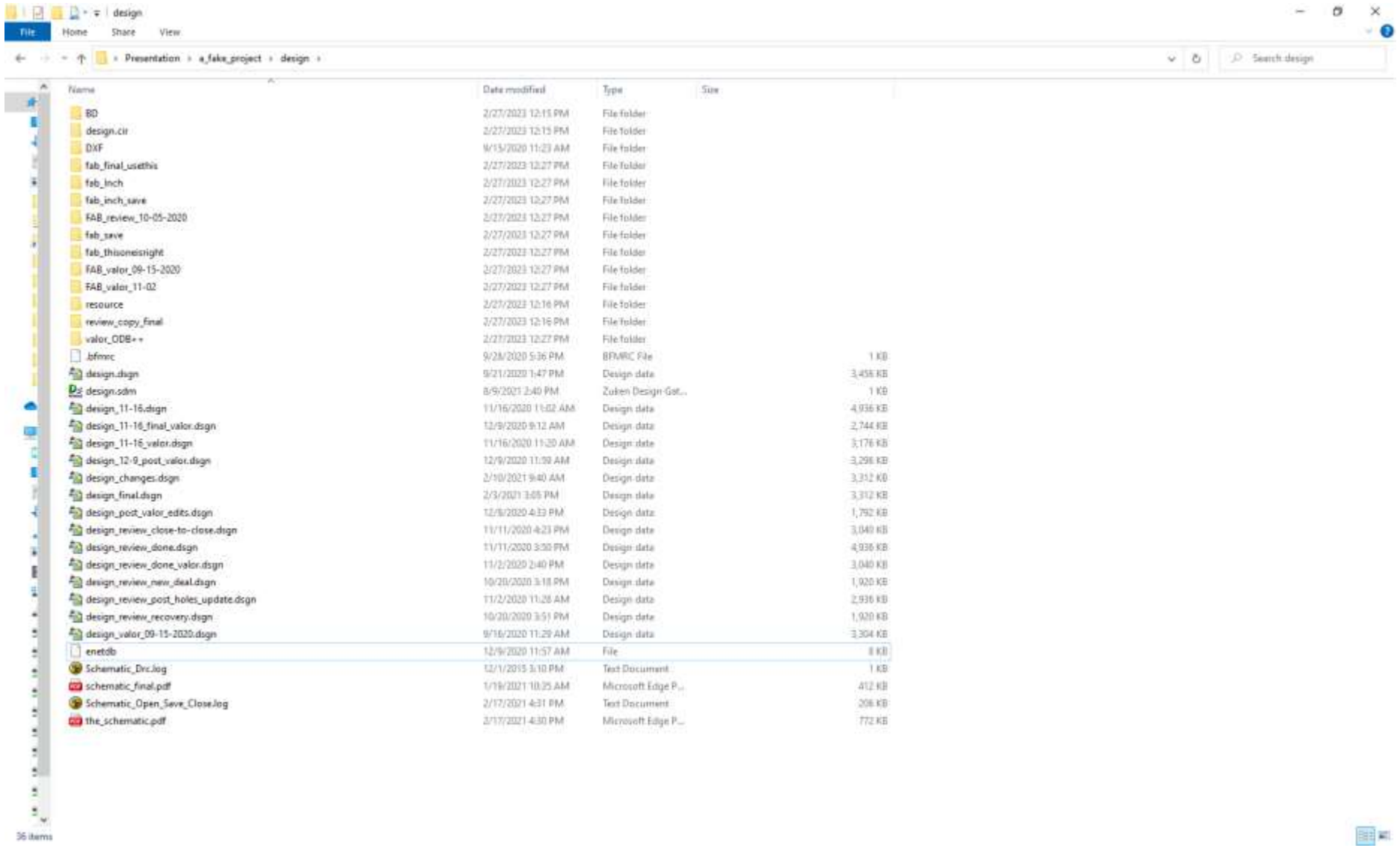
ECAD DATA AT LOCKHEED MARTIN RMS

- Multiple sites of different heritage
- Located across the country
- Common ECAD toolset for PCB and Cable
- Workshare

ECAD DATA MANAGEMENT

- Electrical CAD data not managed well
  - PCB Data
  - Cable Harness Data
- Manual PLM Release, Inconsistent, Errors
  - Rework
  - Scrap
  - Confusion
- Design storage that looked like……

THE WAY THINGS WERE



WHY NOT CHANGE?

- Workgroup Manager methodology
  - Performance
  - Too tightly coupled to versions
  - Capabilities
  - Long term support
- Limited native ECAD data management tools
  - PLM based around MCAD
- Inertia

WHAT WAS NEEDED?

- Bring ECAD Engineering Data under controlled processes
  - Repeatable
  - Trackable
- Check in/out capabilities for WIP ECAD data
- Control of non-PLM artifacts
- Simple way to move data to PLM for Release

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THE ZUKEN SOLUTION: ENGINEERING DATA MANAGEMENT (EDM)

Joe Richlen
Zuken USA Inc.

May 17th 2023

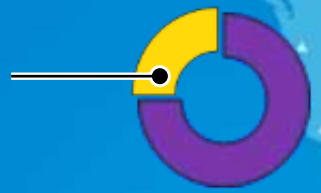
ZUKEN BACKGROUND - GLOBAL PRESENCE

Founded	December 17, 1976
Corporate Headquarters	Yokohama, Japan
North American Headquarters	Westford, MA
European Headquarters	Munich, Germany
Operational Excellence	Profitable, no debt

Headquarters ○ Regional headquarters ● Business locations ■ Main R&D offices ▲ Sales offices

Engineering Resources
82%

R&D Investment
25%
Of Revenue



Japan & Asia

Japan
- ●○■ Global Headquarters/ R&D Center (Yokohama)
- ● Shin-Yokohama Building (Yokohama)
- ● Center Minami Building (Yokohama)
- ● Nagoya Branch (Nagoya)
- ● Kansai Branch (Osaka)

Korea
- ● Zuken Korea Inc.

Singapore
- ● Zuken Singapore Pte. Ltd.

Taiwan
- ● Zuken Taiwan Inc.

China
- ● Zuken Shanghai Technical Center
- ● Zuken Inc. Shenzhen Representative Office

India
- ● Zuken India Private Limited

Americas

USA
- ○ Zuken USA Inc. (American Headquarters)
- ●■ Zuken SOZO Center (Zuken Inc., US branch)

Europe

United Kingdom
- ■ Zuken Ltd. (Zuken Technology Center)
- ● Zuken Group Ltd.
- ● Zuken UK Ltd.

Germany
- ○ Zuken GmbH (European Headquarters)
- ●■ Zuken E3 GmbH
- ● Zuken E3 GmbH
- ■ Zuken GmbH (EMC Technology Center)
- ● Zuken E3 GmbH Office Nord
- ■ Zuken E3 GmbH (Global Automotive and Transportation Competence Center)

Poland
- ● Zuken E3 GmbH Sp.z o.o

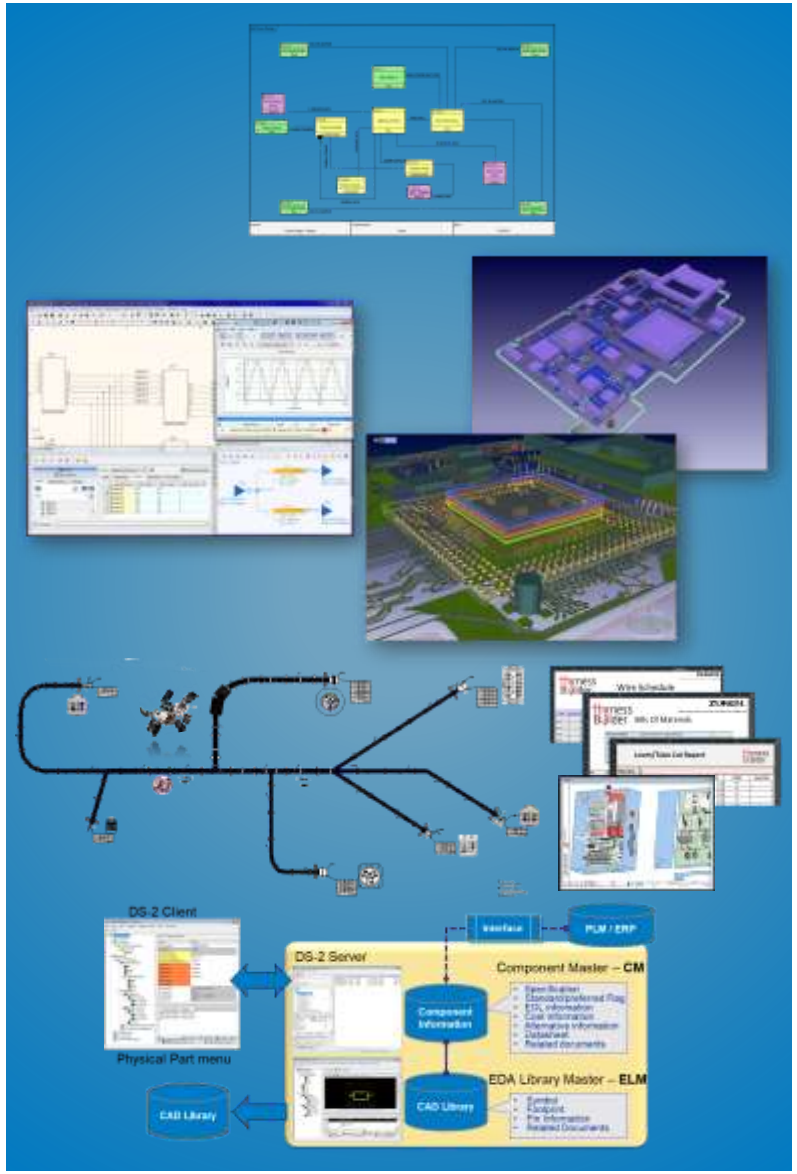
Switzerland
- ● Zuken E3 GmbH, Zweigniederlassung

France
- ● Zuken S.A.

Italy
- ● Zuken Srl

Netherlands
- ● Zuken GmbH, Sales Office Benelux

ZUKEN BACKGROUND - SYSTEMS DESIGN PLATFORMS



Vitech A Zuken Company Model-Based Systems Engineering

GENESYS™

Model-Based SysML Systems Engineering

- Hardware Architecture Design
- System Partitioning
- 3D Printed Circuit, Multi-board Layout
- ECAD/MCAD Co-design
- Chip/Package/Board Co-design

CR-8000™

Electronic Design

- Electrical Wire Harness Engineering
- Fluid Controls Engineering
- Cabinet, Panel, Wire Harness and Formboard Layout
- Manufacturing and Documentation

E3.series®

Electrical Design

Library & Design Data Management for Electronic and Electrical Engineering

DS-Z™

DS CR DS E3 DS OP

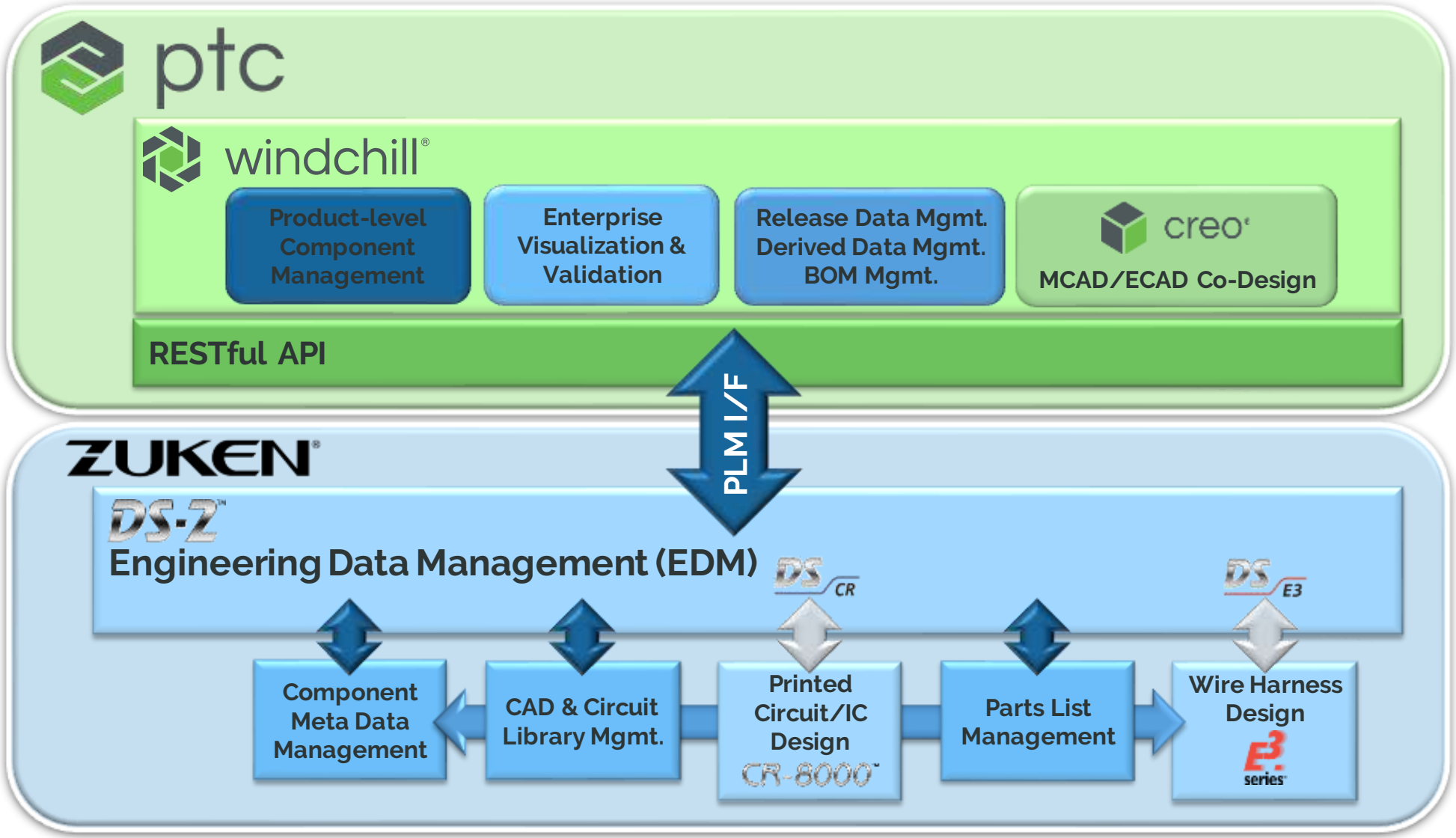
WHY EDM? FILE MANAGEMENT

- Native ECAD Data
- Shared Mechanical Data
- Analysis and Simulation Data
- Engineering Notes
- Component Parametric Data
- Design Rules/Guidelines
- Manufacturing Rules/Guidelines

WHY EDM? CONSISTENT PROCESS

- A collaborative environment
- Accountability
- Accessibility
- Workflows
- Auto-generation of design outputs:
  - Assembly/Manufacturing Data
  - Design Review/Test Data
  - Bill-of-Materials
- Interface to PTC Windchill

PTC & ZUKEN JOINT SOLUTION



EDM

- Work In Process
- Access Control
- Collaboration
- Revisioning
- Versioning
- Modular Design
- Design Reuse
- Design Variants
- Article Mgmt.
- Document Mgmt.
- BOM Mgmt.

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LOCKHEED MARTIN

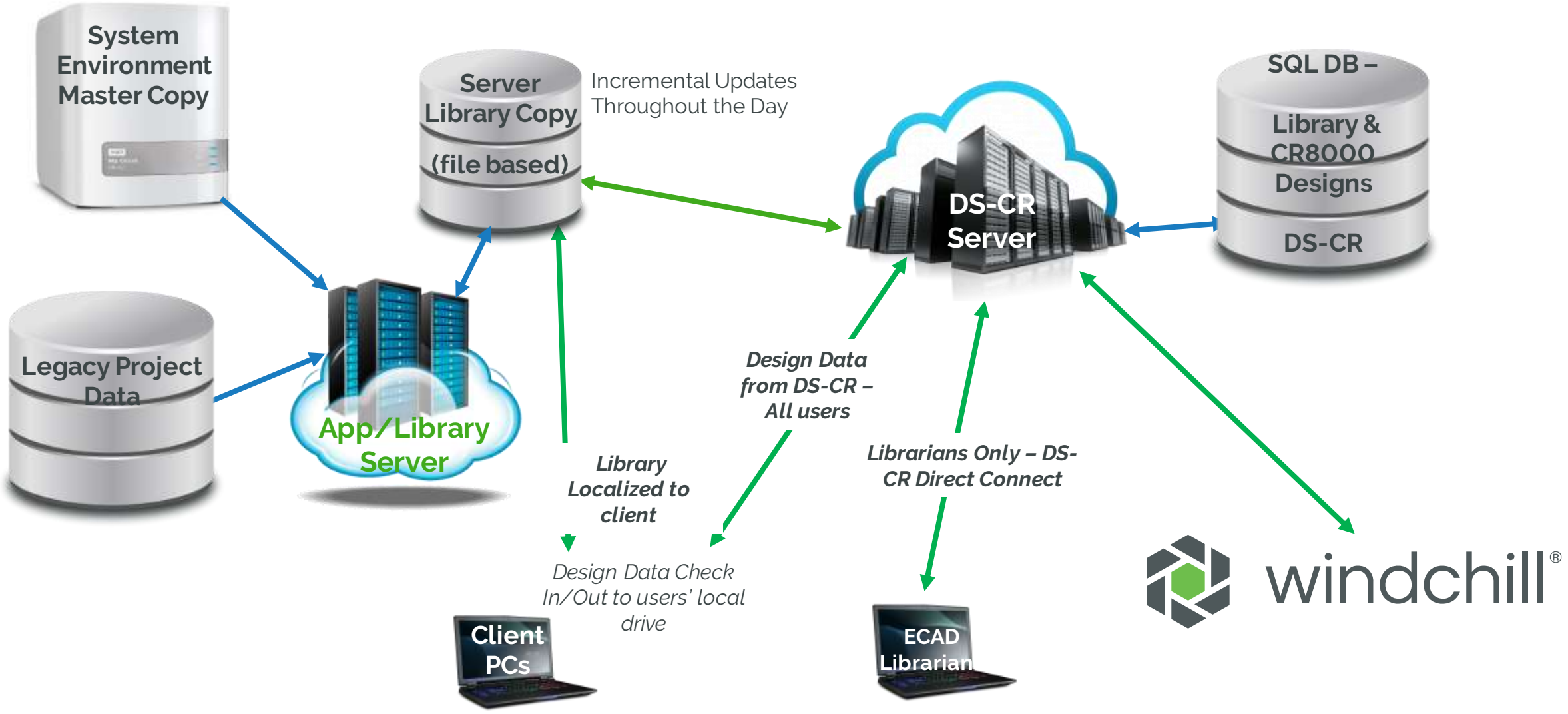
LOCKHEED MARTIN RESULTS AND BENEFITS

Grant Denis
Lockheed Martin

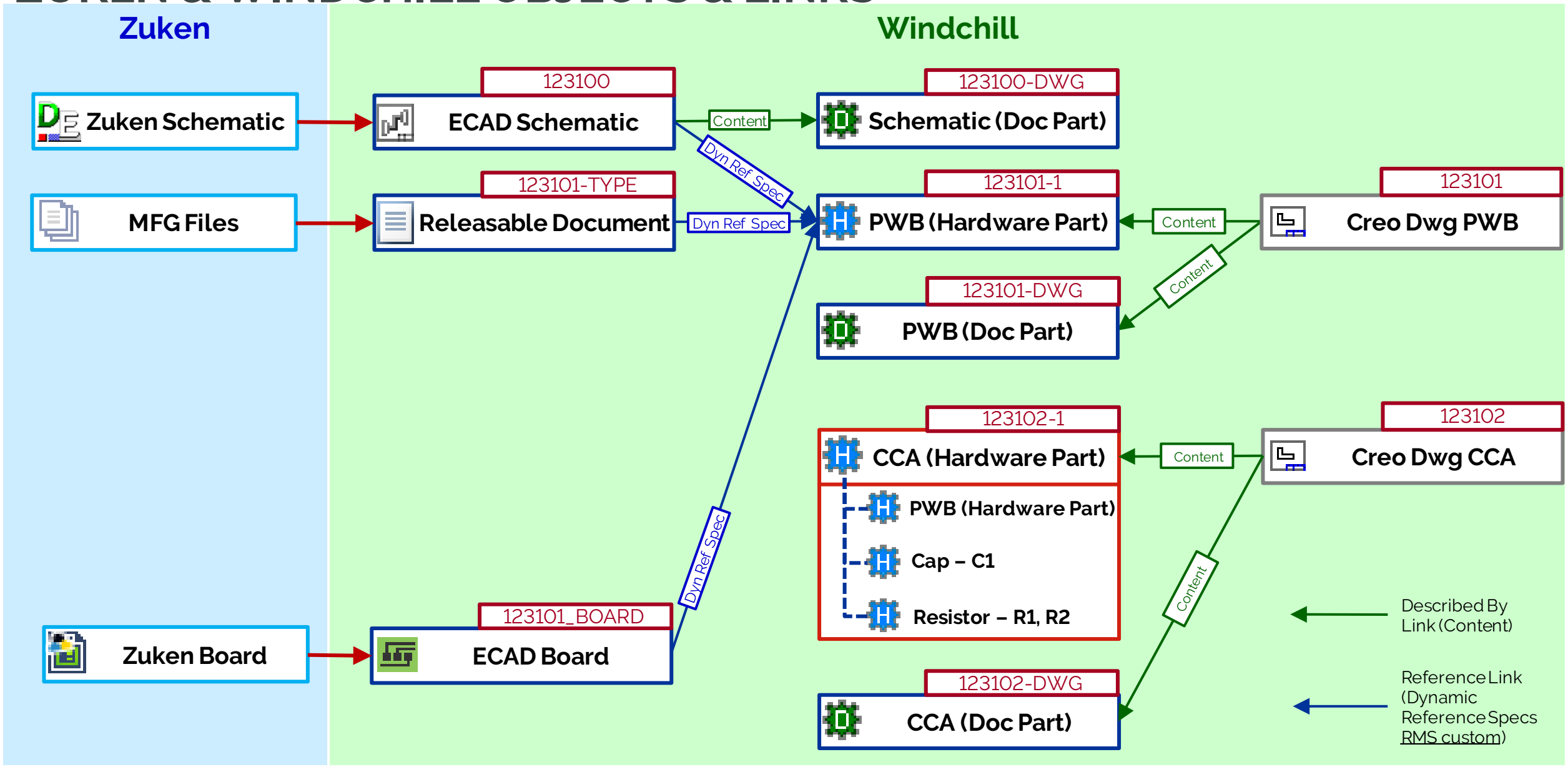
WHAT WAS IMPLEMENTED?

- DS-2 in production use for both PCB and Cable Harness
- Organized creation / management of data
  - Pushbutton transmission to Windchill
- Board & Schematic Data publishes as a viewable
  - No need for downstream users to have CAD tool
- Roughly 1 year from planning to production
  - Some code changes needed to support requirements

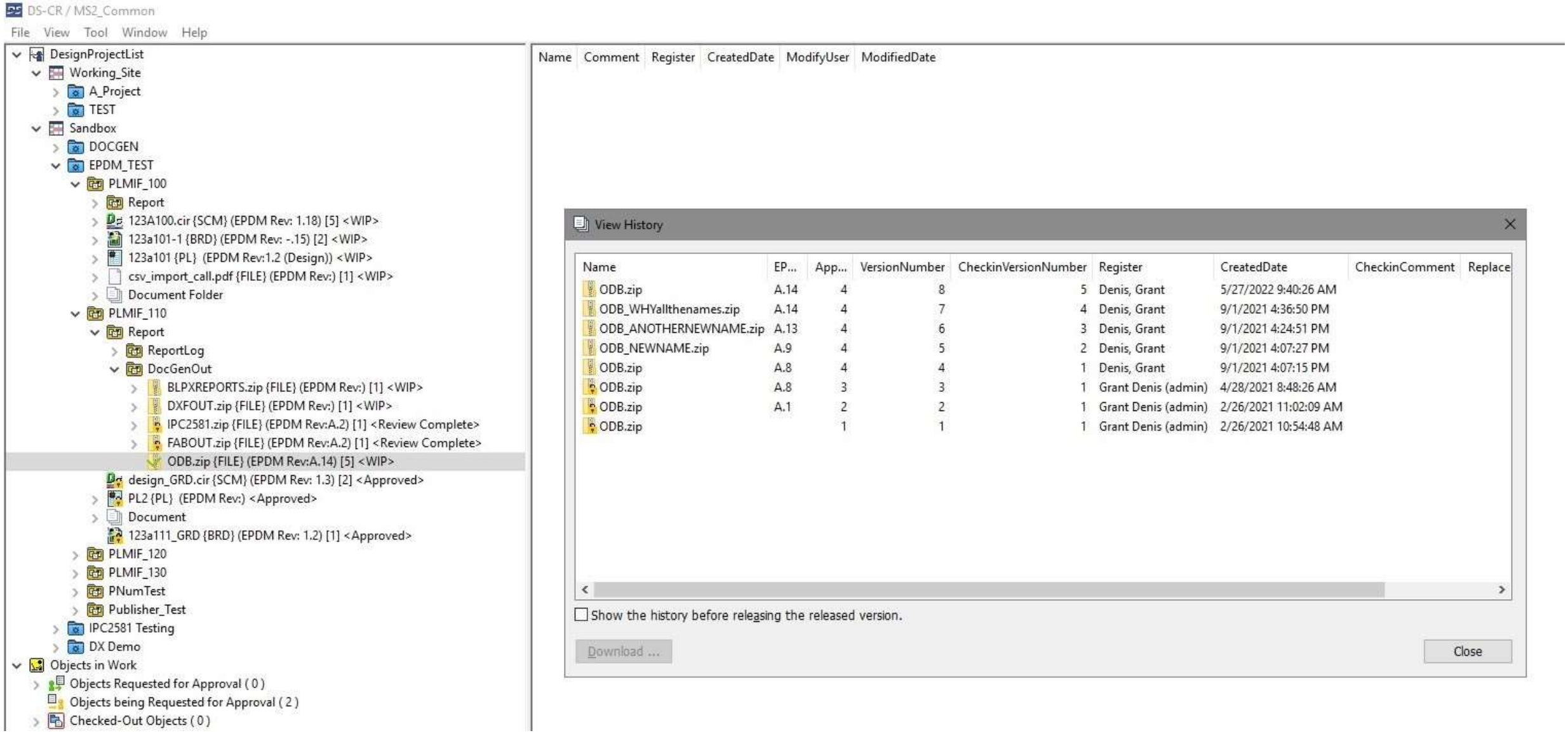
Zuken CR-8000/DS-CR Architecture



ZUKEN & WINDCHILL OBJECTS & LINKS

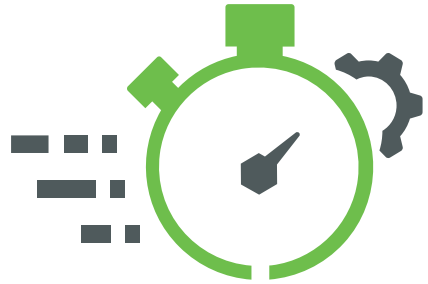


DS-CR EXAMPLE



IMPACTS

- Common Process
  - Release process the same as MCAD once in Windchill
- Repeatable Process
- Control of Engineering Data



WHAT COMES NEXT?

- Retrieving Library parametric data from Windchill
- Automation / Linking of workflow status changes
- Single Sign On

KEY TAKEAWAY SUMMARY

Grant Denis / Joe Richlen

KEY TAKEAWAY SUMMARY

1. Implementing an Engineering Data Management data framework with access controls and protections in conjunction with the Windchill REST API product release system integration.

2. Institute a consistent, repeatable, configuration-controlled design and manufacturing data flow through process and data automation.

3. Streamline the design and manufacture of electronic products, while providing easy access to accurate, timely product data throughout the products' development lifecycle to all stakeholders.

QUESTIONS?

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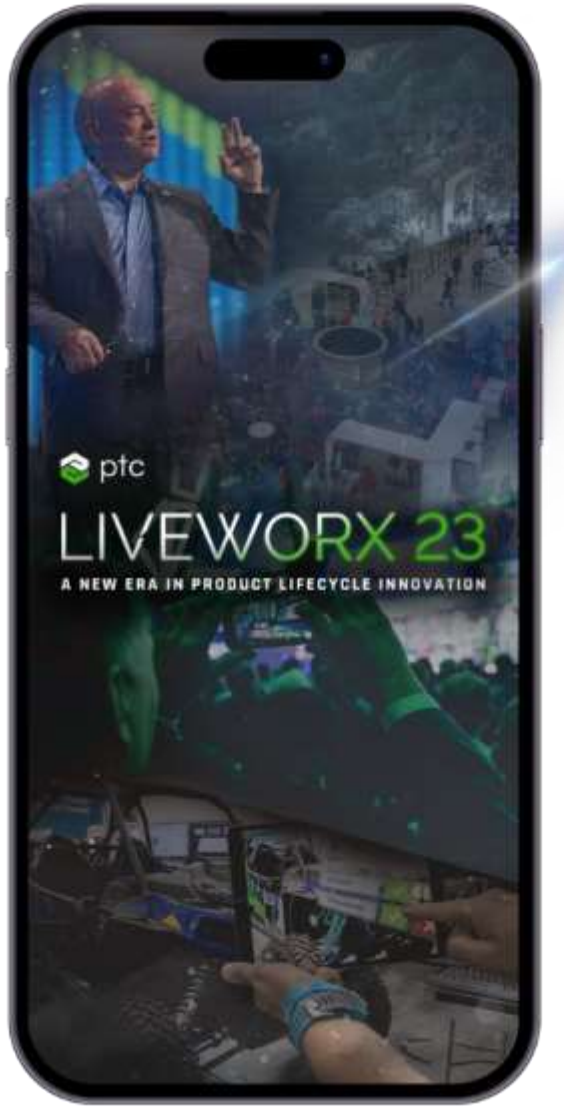
- Joe.richlen@zukenusa.com



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A NEW ERA IN PRODUCT LIFECYCLE INNOVATION

THANK YOU

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