Leveraging Interoperability for Improved Project Reporting

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Mentor Graphics
September 2016

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Grant Blythe Bio

Grant Blythe is a member of the Systems Engineering Products team at Mentor Graphics where he specializes in solutions for military and aerospace applications.

Prior to joining Mentor Graphics, Grant spent 10 years in systems engineering roles developing both commercial and military avionics. In addition to his role at Mentor Graphics, Grant is a member of the SAE S-18 Airplane System Development Committee which publishes the ARP4754A and ARP4761 standards.

Grant holds a B.S. in electrical engineering from Iowa State University and an M.B.A. from the University of Oregon.

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Agenda

- Intro
- Background (GPDIS 2014 & 2015)
  - Problem
  - Approaches
  - Proposed Solution
- Reporting
  - Project Management
  - Design Documentation
  - Compliance and Auditing
- Next Steps

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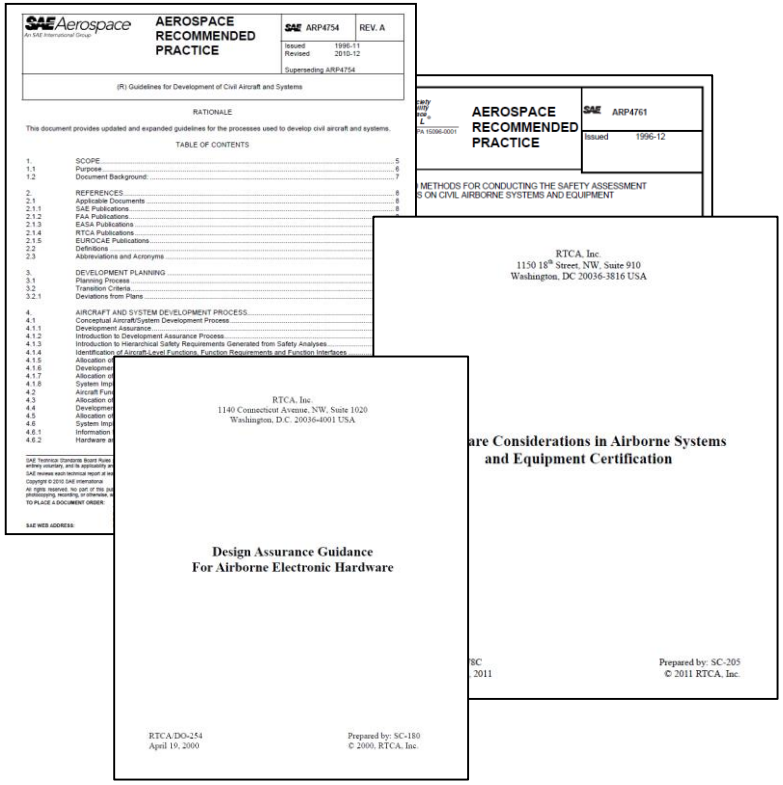
Standards Compliance…

has become increasingly complex resulting in…



Development Process Waste

- ***Transportation Waste***
  - **Manually moving/importing/exporting data between multiple design tools**
  - **Manually reformatting/translating data for use in multiple tools**
- ***Motion Waste***
  - **Staff switching & multi-tasking across several unintegrated tools**
  - **Searching for data in multiple locations**
- ***Waiting Waste***
  - **Attempting to start tasks before inputs are ready**
  - **Tasks not performed according to priority (off critical path)**
- ***Over-production Waste***
  - **Creating & maintaining multiple copies of the same data**
- ***Defects Waste***
  - **Defects introduced during non-value add activities such as moving, copying, translating data**

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Need for a LEAN Development Environment

Current State

- Disjointed
- Erratic
- Variable
- Complex

Ideal State

- Seamless
- Consistent
- Predictable
- Simple

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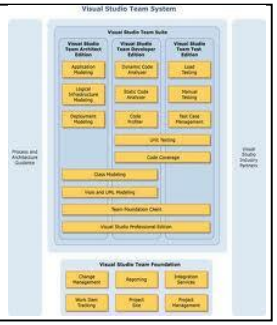
But this is not an easy problem to solve.

Past integration approaches provided limited choice and coverage

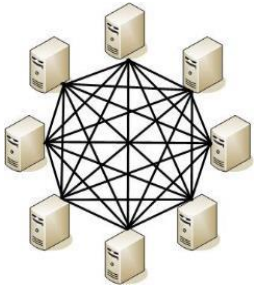
Single repository

"Can I really expect one vendor to provide all the functionality I need? And what about my existing tools?"



Point-to-point integrations

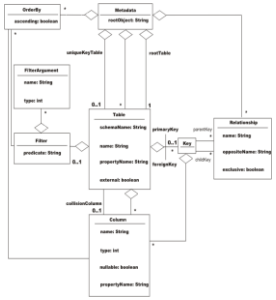
"How can I ever upgrade one tool without breaking everything else?"



Past integration approaches were disruptive and slow to emerge

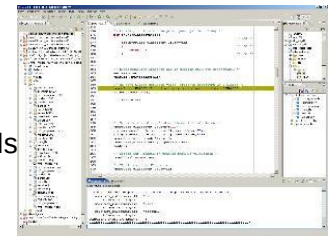
Universal metadata standard

"How did I ever think all those vendors would be able to agree?"



Standard implementations

"Did I really believe that every vendor would rewrite their tools on a single framework?"



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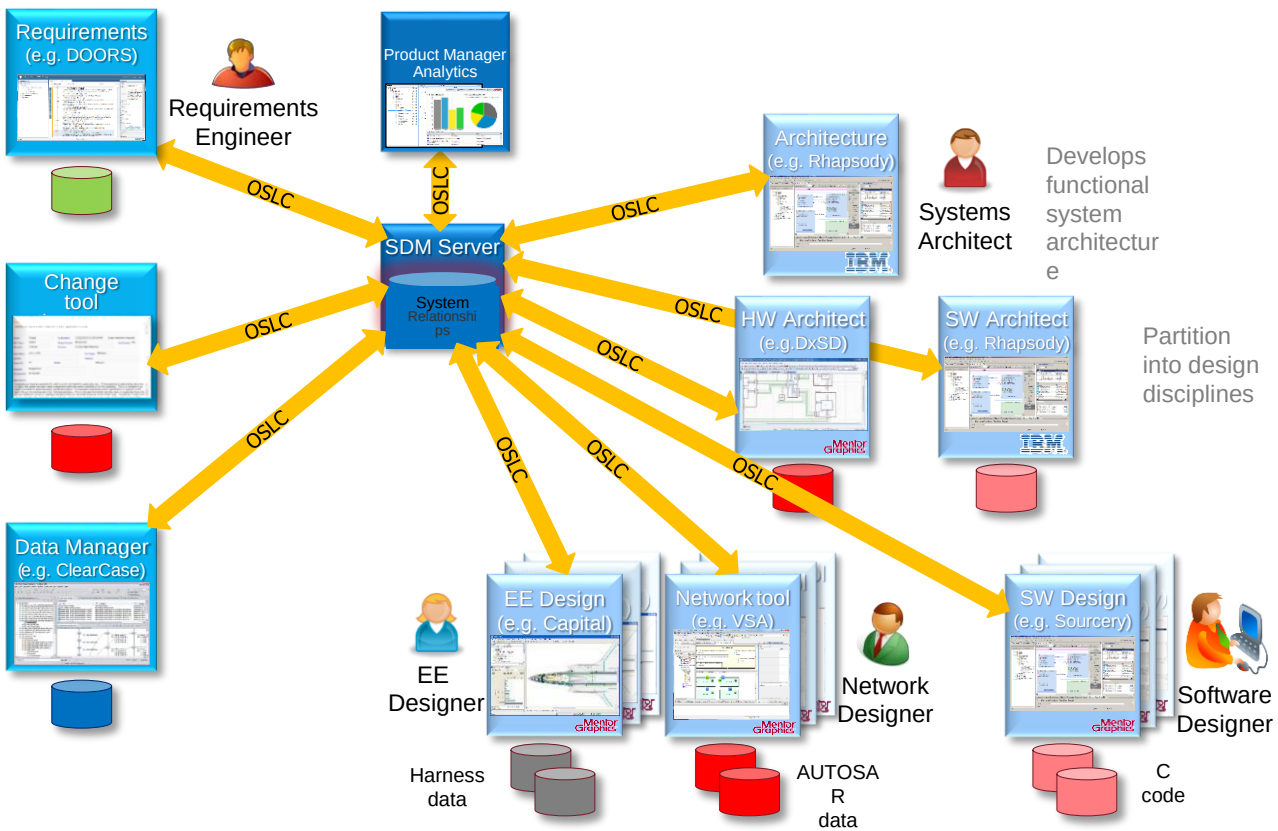
Context System Design Manager (SDM)



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Architect & Plan
your project

Connect & Trace
your data

Analyze & Report
your progress

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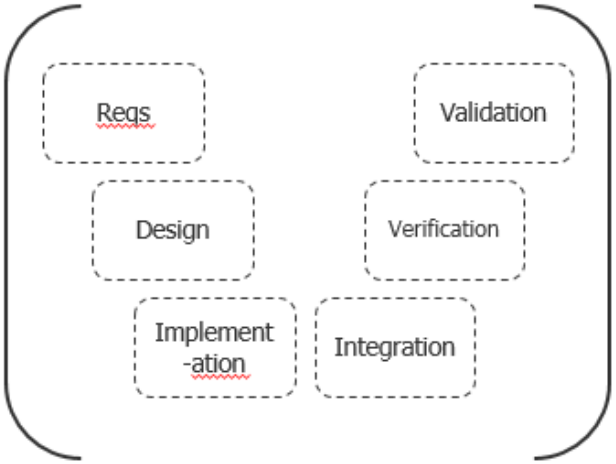
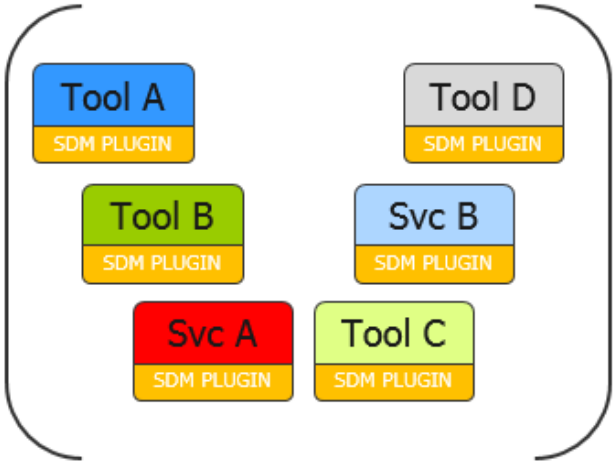
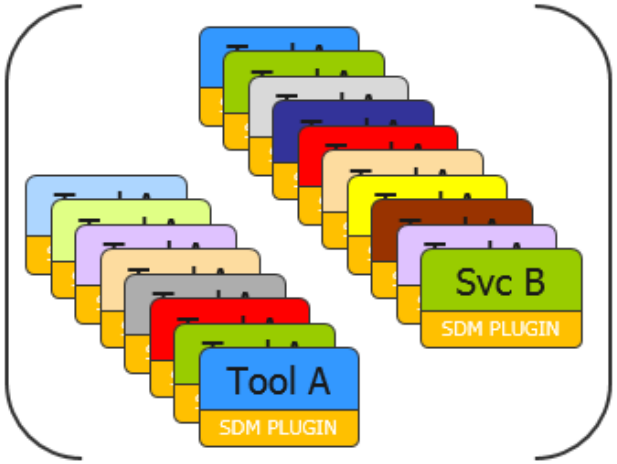
ARCHITECT & PLAN your project







Select and Define the Project Process

Tailored Context SDM Environment

Select from Available Tools and Services

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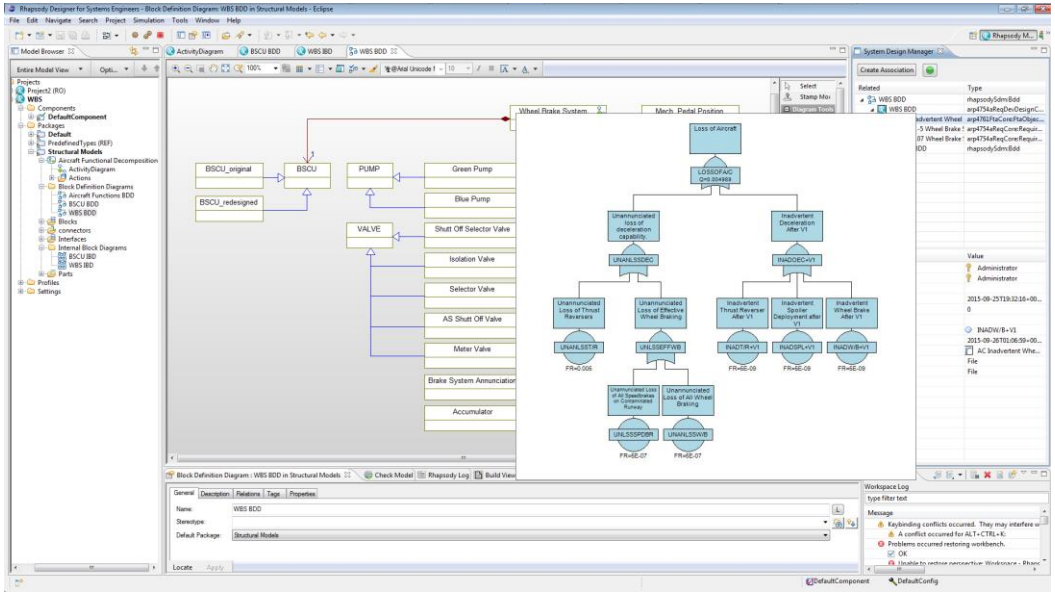
CONNECT & TRACE your data

- A consistent interface allows tracing and connectivity from any tool in your environment



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CONNECT & TRACE your data

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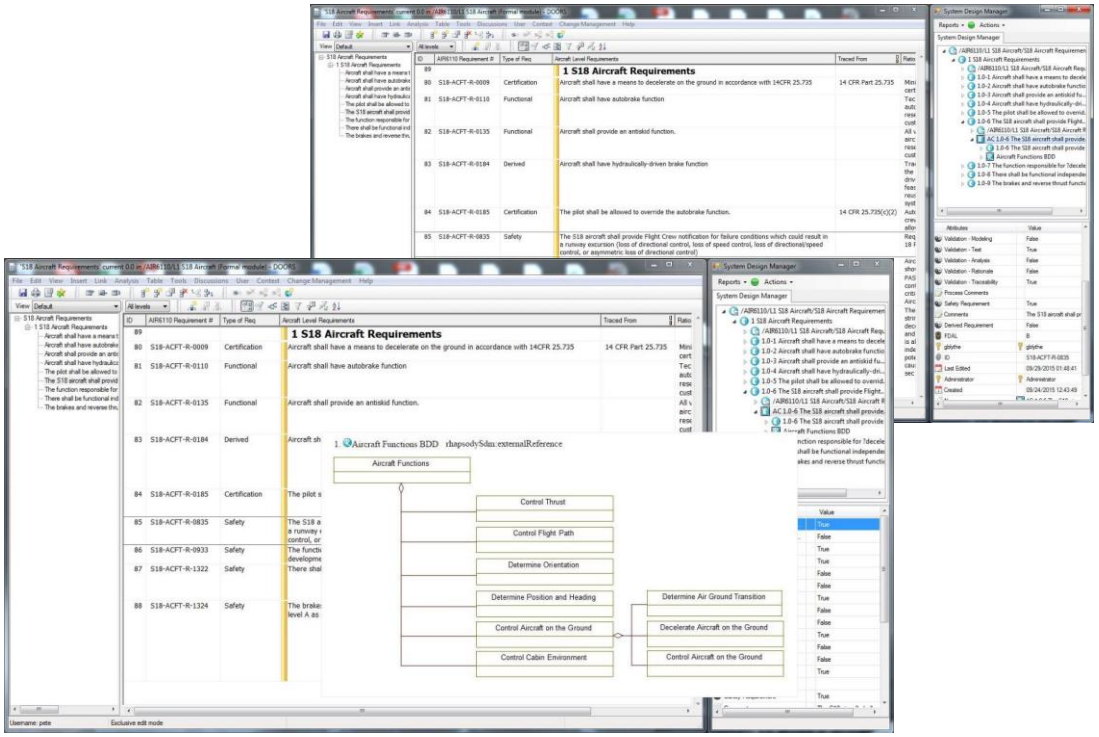

- **Designers and Reviewers can access preview data from dependencies and relationships without leaving the current tool**

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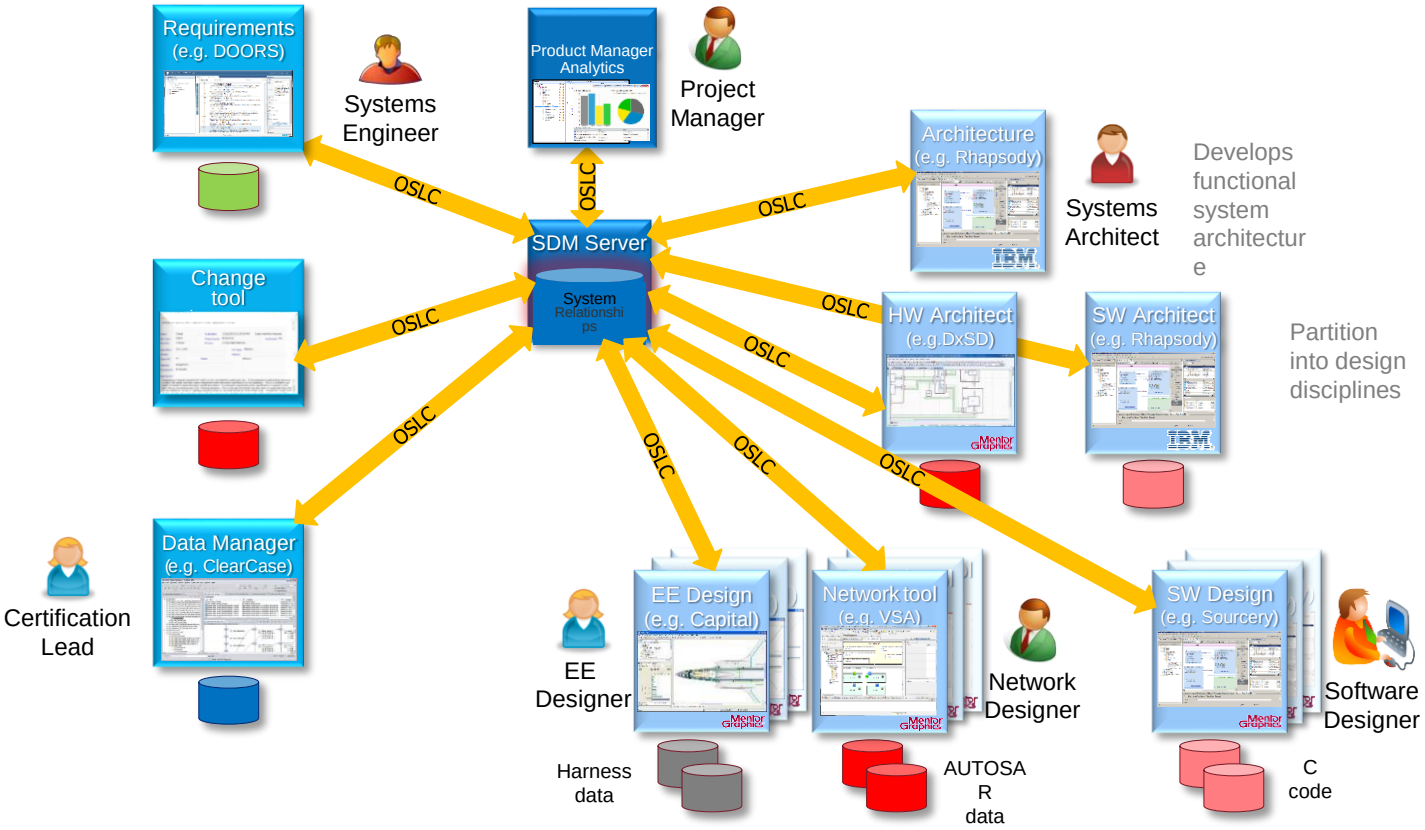
Our OSLC Solution



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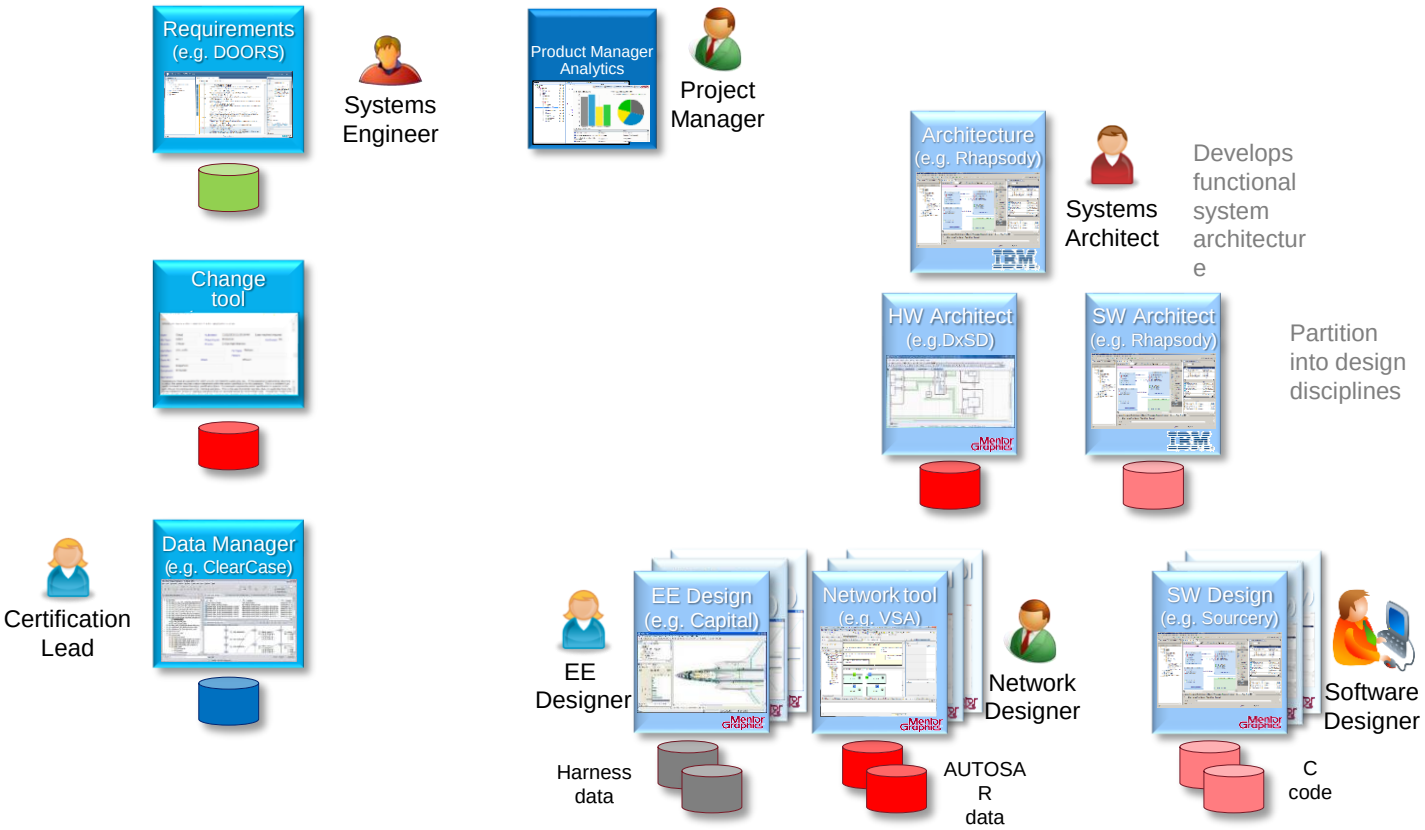
Our OSLC Solution



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Our OSLC Solution

Systems Engineer

Project Manager

Systems Architect

Certification Lead

EE Designer

Network Designer

Software Designer

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Our Stakeholders

Systems Engineer

- Responsible for Product Design/Analysis
- Must author design documents and reports

Project Manager

- Responsible for project budget and schedule
- Must develop and report project metrics

Certification Lead

- Responsible for process compliance and coordination with regulatory authorities
- Must generate process compliance reports and provide auditors with requested product data

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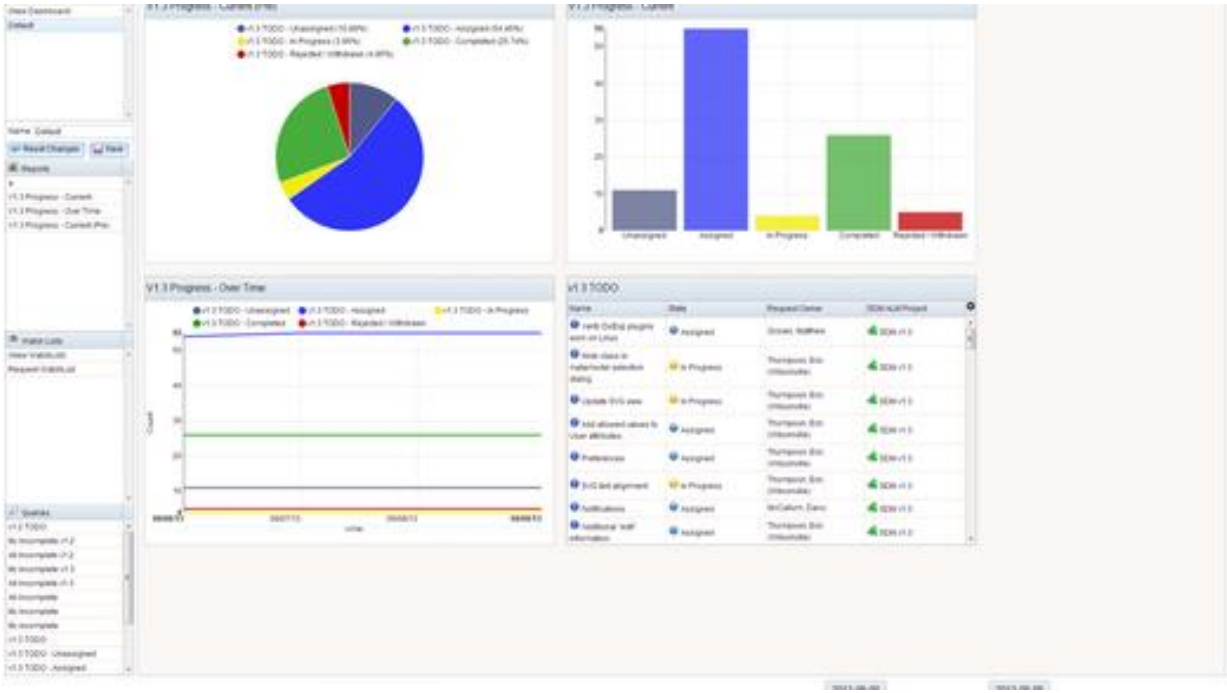
Project Manager

- Project Managers and Team Members have live metrics on project progress



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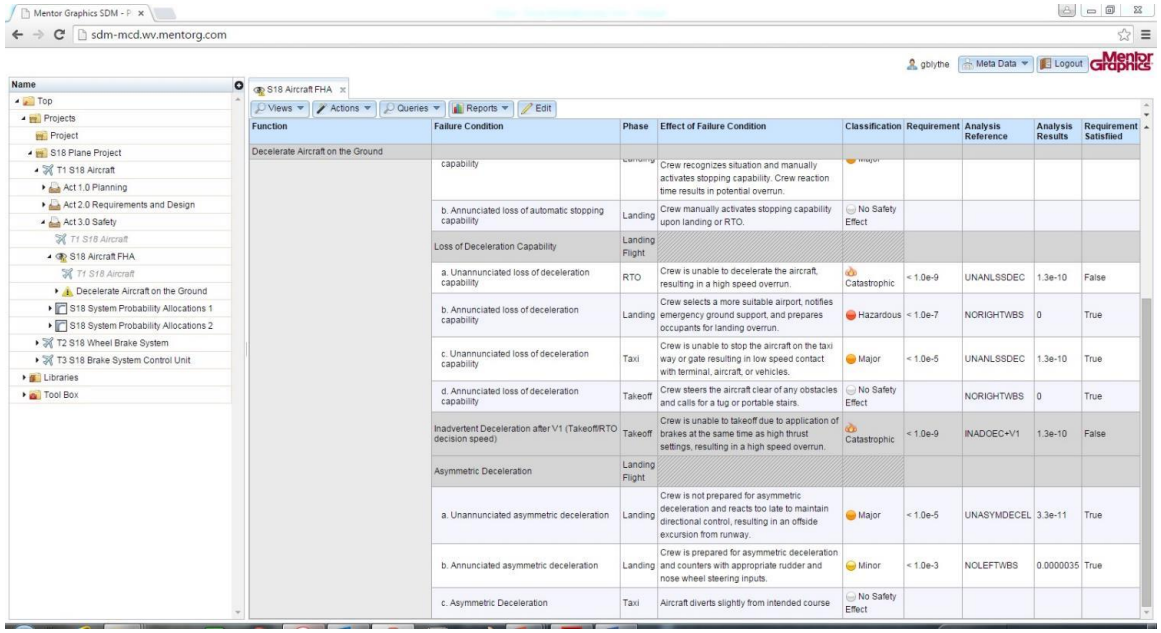
Systems Engineer

- Live, compiled reports eliminate the need to update documentation by hand after design changes



Function	Failure Condition	Phase	Effect of Failure Condition	Classification	Requirement	Analysis Reference	Analysis Results	Requirement Satisfied
Decelerate Aircraft on the Ground								
	capability		Crew recognizes situation and manually activates stopping capability. Crew reaction time results in potential overrun.					
	b. Annunciated loss of automatic stopping capability	Landing	Crew manually activates stopping capability upon landing or RTO.	No Safety Effect				
Loss of Deceleration Capability		Landing Flight						
	a. Unannunciated loss of deceleration capability	RTO	Crew is unable to decelerate the aircraft, resulting in a high speed overrun.	Catastrophic	< 1.0e-9	UNANLSSDEC	1.3e-10	False
	b. Annunciated loss of deceleration capability	Landing	Crew selects a more suitable airport, notifies emergency ground support, and prepares occupants for landing overrun.	Hazardous	< 1.0e-7	NORIGHTWBS	0	True
	c. Unannunciated loss of deceleration capability	Taxi	Crew is unable to stop the aircraft on the taxi way or gate resulting in low speed contact with terminal, aircraft, or vehicles.	Major	< 1.0e-5	UNANLSSDEC	1.3e-10	True
	d. Annunciated loss of deceleration capability	Takeoff	Crew steers the aircraft clear of any obstacles and calls for a tug or portable stairs.	No Safety Effect		NORIGHTWBS	0	True
	Inadvertent Deceleration after V1 (Takeoff/RTO decision speed)	Takeoff	Crew is unable to takeoff due to application of brakes at the same time as high thrust settings, resulting in a high speed overrun.	Catastrophic	< 1.0e-9	INADOEC+V1	1.3e-10	False
Asymmetric Deceleration		Landing Flight						
	a. Unannunciated asymmetric deceleration	Landing	Crew is not prepared for asymmetric deceleration and reacts too late to maintain directional control, resulting in an offside excursion from runway.	Major	< 1.0e-5	UNASYMDECEL	3.3e-11	True
	b. Annunciated asymmetric deceleration	Landing	Crew is prepared for asymmetric deceleration and counters with appropriate rudder and nose wheel steering inputs.	Minor	< 1.0e-3	NOLEFTWBS	0.0000035	True
	c. Asymmetric Deceleration	Taxi	Aircraft diverts slightly from intended course	No Safety Effect				

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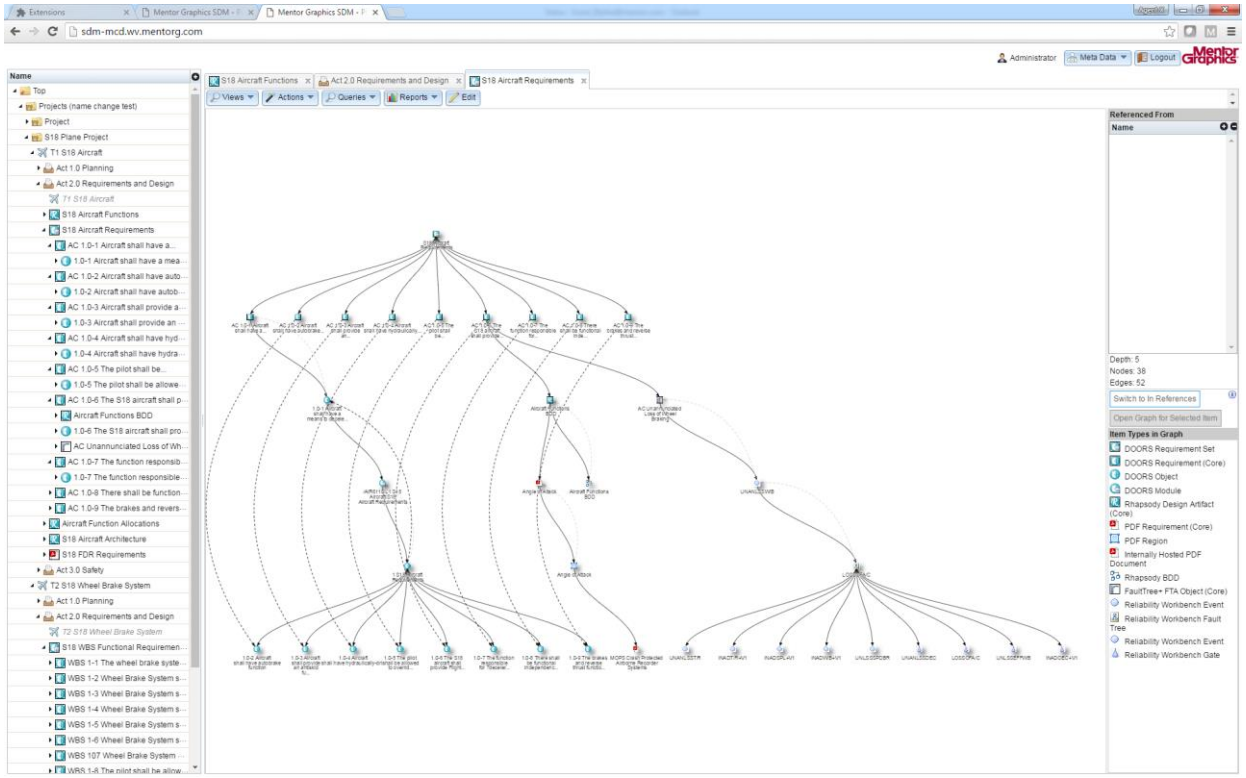
Certification Lead

- Trace reports enable reviews spanning both tools and domains



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Thank you!

For questions, please contact:

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