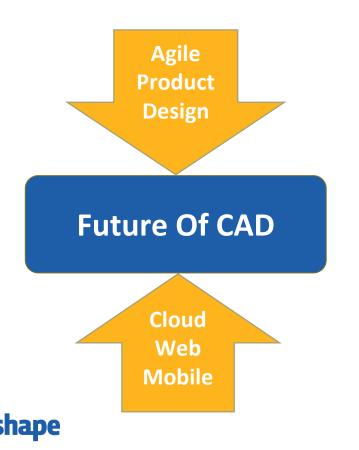


Agile Process + Cloud = Future Of CAD/CAM/CAE



How are our users working differently as they move to Agile Process?

What do we, the CAD/CAM/CAE industry, need to do about it?

Where does component technology fit in the new world of cloud/web/mobile?

Agile Design Needs New CAD Tools

- Users moving to Agile Process for more speed and innovation
- > Traditional installed file-based CAD architecture not good for Agile
- > Full-cloud architecture perfect for Agile
- > Siemens components are perfect for full-cloud architectures



Businesses need more speed and innovation in product design

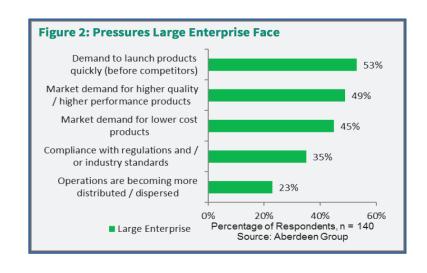
Product Design Speed Is A Top Priority

"Every year for the past 5 years,

<u>Time</u> has been the #1 Pressure
identified by surveyed
companies looking to develop
more successful products..."

Source: Aberdeen Group







The Industry has Spoken

79% of companies said innovation is the **#1, 2, or 3 priority** at their company



Source: Boston Consulting Group (BCG) 2015 survey



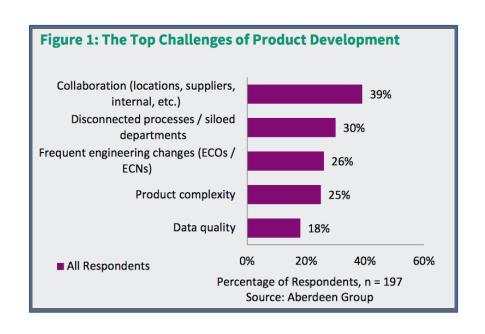
Collaboration and Connection are Obstacles

Top product design obstacles are:

- 1. Lack of collaboration
- 2. Disconnected processes
- 3. Change management

Source: Aberdeen Group







Businesses are moving to an Agile Design Process for product design



Forbes

According to Steve Denning of Forbes Magazine: "The winners in the rapidly changing world of manufacturing will be those firms that have mastered the agility needed to generate rapid and continuous customer-based innovation."





Agile Engineering is a popular process in software development, but few hardware teams





ns why hardware is different from software

information, please see Part 1.

king a purely Agile approach to hardware product

ok on applying Agile to hardware development.

component cost, and the variety of skills needed on

values and explore how the top-3 different conditions

Lean leadership training (19) Hardware project management (13)

Visual work management (11)

Hardware development (R)

Lean case studies (5)

Visual project management (6)

Don Reinertsen (11)

Project risk management (13) Cost of delay (12)

Lean methodology (10) Project economics (10)

Visual project management software (10)

Hardware product development (9)

CAD-Software Blog





Mastering More Agile Product Engineering

by Ailbhe Coughlan

According to Steve Denning of Forbes Magazine: "The winners in the rapidly changing world of manufacturing will be those firms that have mastered the agility needed to generate rapid and continuous customer-based innovation."

Yet most product development processes aren't at all agile. Rather they follow age-old methods in which progress flows through stages. Product requirements are thoroughly defined, the design team then creates models according to those requirements, implementation and prototyping follow, and then

So what's wrong with that? With so many dependencies, a problem or delay anywhere in the cycle can

RESEARCH REPORT | 5/24/2016

THE CHANGING LANDSCAPE OF PRODUCT DEVELOPMENT: IMPLEMENTING AGILE ACROSS THE ENTERPRISE

A practice that first revolutionized the software industry has now been widely adopted by large enterprises, Agile Development. Its methodologies are enabling organizations to deliver products in a more timely and efficient way.



Research Analyst | Product Innovation & Engineering

Tags: Product Development, Agile Methods, Agile Development, Systems Engineering, Enterprise Agile



Traditional Design Process	Agile Design Process
Serial processes, checkout, locking	Parallel processes, concurrent work, collaboration



Traditional Design Process	Agile Design Process
Serial processes, checkout, locking	Parallel processes, concurrent work, collaboration
Time constants of weeks, months, years	Time constants of minutes, hours, days



Agile Design Process
Parallel processes, concurrent work, collaboration
Time constants of minutes, hours, days
Scrums and agile project boards



Agile Design Process
Parallel processes, concurrent work, collaboration
Time constants of minutes, hours, days
Scrums and agile project boards
Text messages, video calls, Slack



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Work at desks, fixed team, fixed locations	Work anywhere, fluid team, global, mobile



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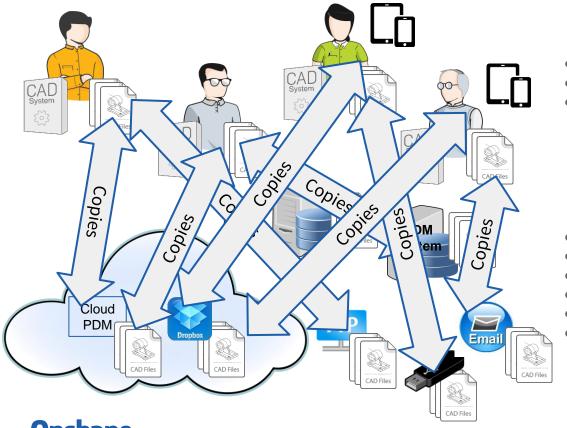


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Innovation requires working around process and tools	Innovation is accelerated by process and tools
Management receives out-of-date monthly reports	Management has continuous access to real-time analytics



Installed File-Based CAD and PDM Architecture works against Agile Design

File-based CAD and PDM Unsuited For Agile



Hard to Deploy To Agile Team

- Downloads, installs, updates, service packs
- Expensive license codes and servers
- Is everyone on the same CAD software version?

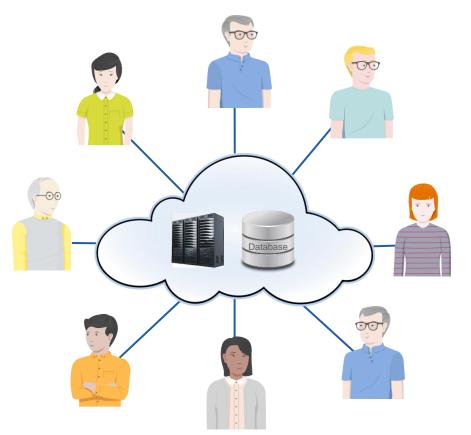
File Copies Force Non-Agile Workflow

- Where's the latest version?
- Are you overwriting someone else's work?
- Someone else overwriting your work?
- Checkout and locking hassles
- Slows teams down
- Discourages innovative experiments

Onshape

Agile design requires a new full-cloud database CAD architecture

A New Generation: Full-Cloud Database Architecture



CAD/CAM/CAE software and data live in one place in the cloud

No downloads, no installs

No files, no copies

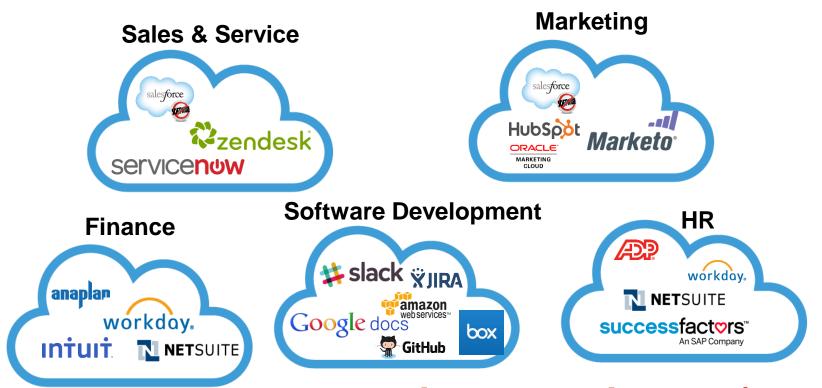
Real-time access for everyone in the enterprise

How we all should build the future

Siemens components work great in this architecture

Onshape

Full-cloud Architectures Revolutionizing Other Disciplines



Why not Product Design?

Some Said "It'll never work"

"What about performance?"

"Big companies will never trust it"

"It'll never have all the functionality"

"You can't build it with component technology"

- Source?
 - Comments in 1994 about SolidWorks on Windows
 - Comments in 2013 about Onshape on Cloud/web/mobile

Onshape

Three Agile Benefits Of Full-Cloud Architecture

- > Real-time deployment
 - Instantly deploy to all team members the moment they join the team on all of their devices
 - Instantly de-provision when members leave the team
 - No lingering "offline" copies
- Real-time collaboration and data management
 - When anyone, anywhere makes any edit...
 - ...everyone, everywhere can instantly see it
 - No more locking or checkout or syncing
- Real-time analytics and controls
 - Up-to-the-moment data and controls for managing Agile teams



Onshape Inc.

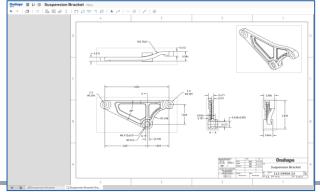
- Only company 100% focused on cloud and mobile CAD
- > 1,000s of companies designing with Onshape
 - Consumer products, machinery, medical, and many other industries
- Founded in November, 2012
 - Based in Cambridge, MA
 - 120 employees
 - Original SolidWorks team
 - Plus cloud, mobile and datacenter leaders



Onshape: Full-cloud CAD











Onshape Team: A Happy 23-Year Siemens Components Customer

- 1993: SolidWorks Licenses Parasolid and D-Cubed
- 2012: Onshape Licenses Parasolid and D-Cubed 2D and 3D DCM
 - Yes we looked at everything
 - Parasolid and D Cubed proven to work great for full-cloud architecture
- 2016: Onshape Licenses Convergent Modeling and JT Open Toolkit



Why Onshape Chose Siemens Components

- > Technical excellence
 - Powerful, accurate, reliable, performant
- Great support
- Continuous improvement and vision
- Commitment to components business and openness
- Works great in full-cloud architecture



Convergent Modeling Is Huge

- An Awesome Parasolid Vision
 - Make facet data 'first-class' alongside BRep data
 - Unified set of modeling functions
 - No 'conversions' or 'add-ons'
 - Wow
- Why facets?
 - 3D printing has increased facet popularity and "currency"
 - Generative design and shape optimization produce facet models
 - **Scanned** facet data becoming part of the design process
 - o Reverse engineering, medical, dental, architectural, as-built, inspection, art
 - **Entertainment** (games, movies, etc) 3D content



Parasolid Convergent Modeling Released in Onshape

