

Scrum at the Intersect of Mobile, Cloud, and the Internet of Things

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Speaker Profile

- Agile Transformation Lead
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- Agile Leadership Coach (LA360)
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What are we going to talk about?

- Reflect on where **Scrum and Agile** are being applied **today**
- Discuss the **Internet of Things** (IoT)
- Identify common **patterns for success** in applying Scrum in the IoT and other places **beyond traditional software** development

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Why is this important?

- The IoT is an **explosive** market
- Hardware centric companies are adding more and **more software** to their devices
- **Hardware sales still drives their business**
- Their **traditional** hardware based product development **practices and lifecycle no longer suffice**
- **They need help** applying agile to their hardware, embedded, and software environments

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Where is Scrum being applied in software today?

- Finance
- Healthcare
- Automotive
- Aerospace
- Government
- **Virtually All Software Environments**

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How do we know?



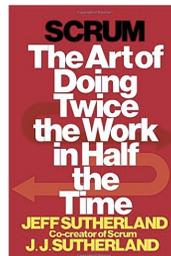
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Where is Scrum NOT being applied in software today?

- In environments where **agile has failed**
- In environments that are **afraid of change**
- In environments where there is **no perceived need** for change
- The use of Agile/Scrum has little to do with the **type** of work being performed

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Are some software projects TOO LARGE?



From Wikipedia:
Sentinel \$425M.
 Delays and over budget.
Went Agile and completed under budget



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Let's Assume

- Scrum can be applied to **any kind of software**
- **No software project is too large** to benefit from some Scrum and/or Agile
- Is there a **sweet spot**?

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Life in the Clouds



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Mobile is Agile



"Samsung is using a **faster method** of developing smartphones **called 'Agile'** methodology. The adoption of the **new method** may bring forward the launch date of the Galaxy S7."

Tech Times, Aug 2015



中国移动通信
CHINA MOBILE

Agile China 2010

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Much of Mobile is Embedded

- ▣ Years ago many people thought that **embedded** software **was different** and they could not do Agile
- ▣ **No-longer** the case
- ▣ Techniques have **always existed** and tooling continues to improve
- ▣ See **James Grenning's** work on Embedded TDD

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The Internet Of Things

“Explosive
Internet of Things
Spending to Reach \$1.7 Trillion
in 2020” - IDC

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Wikipedia Definition

“The **Internet of Things (IoT)** is the network of physical objects or “things” embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. ... Experts estimate that the IoT will consist of almost 50 billion objects by 2020.”

https://en.wikipedia.org/wiki/Internet_of_Things

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Imagine for a moment...

You are designing and delivering software products...

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You are designing and delivering software products...

- Is there value in...
 - Knowing where it is running?
 - Understanding what it is doing?
 - Verifying that it is working?
 - Allowing it to provide feedback?
 - **Of course there is...**

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Now imagine for a moment...

You are designing and delivering **physical** products...

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You are designing and delivering physical products...

- Is there value in...
 - Knowing where it is?
 - Understanding what it is doing?
 - Verifying that it is working?
 - Allowing it to provide feedback?
- **With software we take this for granted**

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The Internet of Things (IoT)

- The IoT allows devices to communicate
 - Where it is
 - What it is doing
 - How it is working
- And most importantly
 - To gather and share information about their environment

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Where is your product?



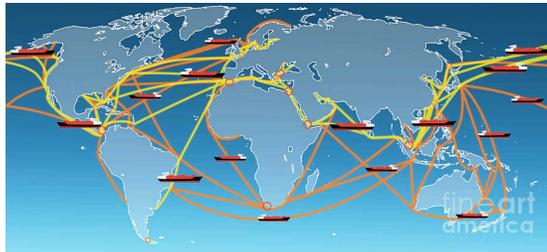
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Where is your product?



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Where is your product?



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Where is your product?



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Where is your product?



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Tom Cruise in Minority Report (2002)



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Interactive Retail Shopping

- Beacons to track customer movement
- Knowing what the customer was interested in
 - If he spent 5 minutes comparing coffee makers then send him an email when the one he spent the most time with goes on sale
- Real-time shelf inventory (rather than POS)
- Dynamic pricing based on inventory or weather
- Suggesting items based on current or past purchases

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Where is your product?



- WiFi
- App for Scheduling
- Firmware updates?
- New functionality?

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Where is your product?



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Wearables



WATCH



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Wearables in Healthcare

THE HUMAN SIDE OF DATA
People go to hospitals to get well. Unfortunately, many will become even sicker because of exposure to bacteria and other germs. They will be the unwitting recipients of Hospital-Acquired Infections, known as HAIs.
1 IN 20 PATIENTS WILL GET AN HAI. 99,000 WILL DIE.
Previous methods to track hand washing proved challenging for care providers.

WITH AWARENESS COMES ACTION
After alerts feel alarmed about their behavior they are more likely to wash and change it.
A 30% increase in compliance with hand washing surveillance with AgileTrac in first eight weeks after implementation.
The AgileTrac system collects better data quality than traditional manual tracking systems.

HOWEVER, EMPOWERING PEOPLE WITH INFORMATION AND TOOLS MAKES A BIG DIFFERENCE.

GE'S AGILETRAC
is core to the hand washing monitoring system that detects the gel, liquid and foam and tracks, streamlines and alerts care providers.

1. SENSORS
2. COMPLIANCE TRACKING
3. REAL-TIME MEASUREMENT

THE RESULTS
700% increase in hand hygiene
1.8M reduction in HAIs

Safe handwashing procedures have the potential to reduce the number of HAIs, decrease risk to patients and caregivers.

DATA BECOMES A POWERFUL TOOL FOR COLLABORATION.

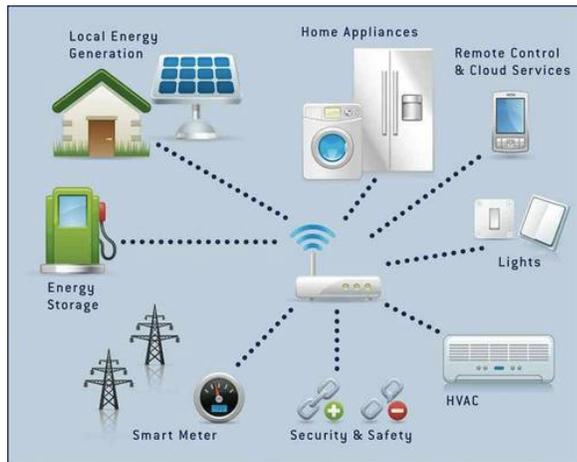
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Wearables in the NFL



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Energy



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Agriculture



“The 8R line of **tractors** has **more** lines of **code** than the **space shuttle**”

- Samuel Allen,
CEO John Deere

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Agriculture



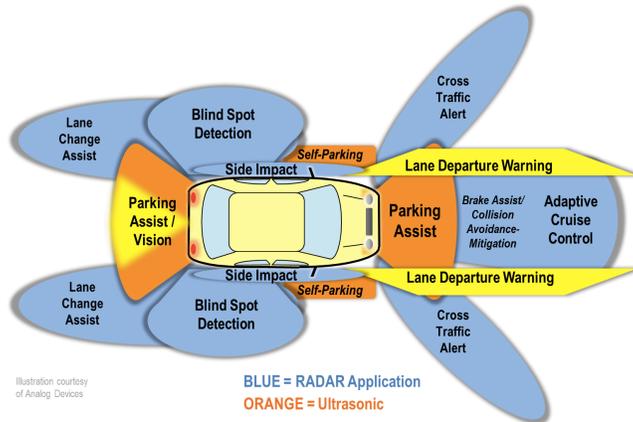
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Drones



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Automotive



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Automotive



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How many lines of code in a toilet?



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So what does this have to do with Scrum?

- Hardware centric companies are adding more and **more software** to their devices
- Some **traditional manufacturers** are finding themselves shifting toward **software and services**
- **Traditional** development **practices** are not enough
- **Scrum can help** in this non-traditional environment
- **Don't be afraid to use it!**

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Patterns

- Agile Leadership
- Start with the Principles
- Think Lean
- Try Scrum
- Discuss Kanban
- Understand Systems Engineering
- Focus on Incremental Improvement
- Relax on the Rules
- Don't be an Agile Bigot
- The IKEA Effect

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Agile Leadership

- In **software** shops many people, **even** at the executive level, have **some** idea of what Agile is
- **In a non-software centric environment, that is onot be the case**
- **Provide Executive Overviews** and **coaching** for the Leadership teams
- Executives should provide **visible support** and encouragement for the transformation
- Make sure those in charge understand **what Agile will mean** to their organization

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Start with the Principles

- A slow walk through the Agile **Manifesto** can usually **take the conversation** where ever it needs to go
- **Everyone** needs to understand the values and principles
- Starting your training with **the Manifesto** and associated values allows many **concerns** to be **uncovered**
- Ask **non-software** people to replace 'software' with '**product**' or whatever works for them

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Being sensitive to non-software

We are uncovering better ways of developing **software product** by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over processes and tools

Working **software product** over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

agilemanifesto.org

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Agile Principles 1-4

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable **software product**.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working **software product** frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.

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Agile Principles 5-8

5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working ~~software~~ **product** is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

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Agile Principles 9-12

9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity — the art of maximizing the amount of work not done — is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

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Think Lean

- **Hardware** folks are more likely to know a lot **more about Lean** than Agile
- **Talk** about Lean
- Use **Inventory** Analogies
 - i.e. Not releasing software is just as wasteful as not releasing inventory
- Create a **Value Stream Map**
- Build **Quality In**
- **Minimize Waste**

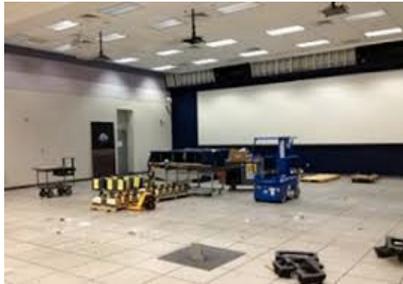
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Try Scrum Beyond Software

- Scrum can be used to manage **any kind of work**
- The Scrum framework and associated practices help teams learn how to **work together** as a team
- Scrum **exposes** all sorts of impediments
- Scrum **teaches** teams how to improve
- I almost always **start with Scrum**

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Scrum is not just for Software



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If Necessary, Discuss Kanban

- The notion of a **2 week Sprint** sometimes **stresses out non-software teams**
- Let them know if the time box of a Sprint ultimately becomes a **constraint** we can **apply Kanban**
- But **first** try Scrum and apply Kanban if the Sprints truly are an unreasonable constraint
- Kanban alone may not provide enough structure for **new teams** trying to become Agile

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Understand Systems Engineering

- **Systems engineering** is an **interdisciplinary** field of engineering that focuses on how to design and manage complex engineering systems over their life cycle
https://en.wikipedia.org/wiki/Systems_engineering
- Years ago Systems Engineering was **common** on large complex software projects
- Many companies building **both hardware and software** systems **still rely heavily** on Systems Engineering
- Systems Engineers **sometimes** make great **Product Owners**
 - Other times they **cannot let go of the 'how'**

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Focus on Incremental Improvement

- **Do not waterfall** your agile transformation
- You cannot figure it all out up front **before you start**
- **Get a pilot team working** – start with application level, then embedded, then hardware
- **Demonstrate, then duplicate, success**
- Let the pilot **expose the pain points**
- **Manage the pain**
- **Don't scale bad Agile**

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Relax

- **Mechanical and electrical engineering ARE different** than software engineering
- The closer you are to the hardware the harder it is to deliver something to a customer every Sprint – **but it is getting easier**
- **Let the team guide you** to what can be achieved in a Sprint
- You may see **less Cross-Functional Co-Located** Teams
 - Help teams see the **value in cross-functional colocation** but do not expect them to be created on day 1
- Challenge teams to **engage and improve**

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Don't be an Agile Bully

- It is unlikely that the **company's top goal** is to 'be Agile'
- They most likely have **other goals** and have determined that **Agile may be the best tool to help** achieve them
- Agile in software is **understood** by many
- Agile outside of software is **still new** to many
- **Don't assume** you have all the answers
- **Help** non-software teams **understand** Scrum/Agile and then **ask them** how **they** can best apply it to their teams

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The IKEA Effect

The IKEA effect is a cognitive bias in which consumers place a disproportionately high value on products that they partially created.

- https://en.wikipedia.org/wiki/IKEA_effect

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These Patterns Work for Software Too!

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Questions and Comments

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