Proudly sponsored by the DoD, IUP and Pennsylvania Highlands Community College

CYBERSECURITY WORKSHOP

Feb 29 & Mar 7, 2020

Planned Activities

- Introduction to the CySP Program
- Hands-on activities using the Raspberry PI
- Guest speaker presentations by security experts
- Hands-on session on Scrum Team and security of various physical systems (airport, hospitals, etc)
- Hands-on activities on threat modelling, attack trees, and misuse cases.

Workshop Details

9:00 a.m. to 3:00 p.m
each Saturday

PHCC
Richland Campus
Rooms B112 & B120
101 Community College Way
Johnstown, PA 15904

- Space is limited, please act now
- Open to all interested Community College students and faculty.
- Lunch will be sponsored.

REGISTRATION INFORMATION

Email CyberWS@pennhighlands.edu
An auto-reply will have further information about the event, as well as a Google Form to register.

PARTICIPATION ADVANTAGES

- **Student participants receive a Raspberry Pi 4 Starter Kit with Fan Cooled Case**
- **Faculty participants receive a $500 stipend**

CYBER SECURITY WORKSHOP

PARTICIPATION ADVANTAGES

Offered at no cost!

Student participants receive a Raspberry Pi 4 Starter Kit!

Faculty participants receive a $500 stipend

Skills and knowledge for a growing career field!

Free lunch provided!

REGISTRATION INFORMATION

Send an e-mail to
CyberWS@pennhighlands.edu

An auto-reply will provide more information.

WORKSHOP DETAILS

Feb 29 & Mar 07, 2020

The workshop is held over two consecutive Saturdays.

Penn Highlands Community College
Rooms B112 & B120
101 Community College Way
Johnstown, PA 15904

PROJECT PI'S

Dr. Waleed Farag
Director, Institute for Cybersecurity
Professor, Computer Science

Dr. Imran Ghani
Associate Professor, Computer Science

SPONSORED BY:

Department of Defense

Indiana University of Pennsylvania

PENNSYLVANIA HIGHLANDS COMMUNITY COLLEGE

Proudly Presented By: DoD, IUP & PHCC

DoD CySP & CAPACITY BUILDING PROJECT INFO

DoD Cyber Scholarship Program

The DoD CySP is a federally supported program to encourage the recruitment of cyber talent to suport national infrastructure.

Under the leadership of the Project PI, Waleed Farag, IUP, along with a selected group of national universities, has been awarded funding in the 2019–20 academic year from the Department of Defense (DoD) in support of the Cyber Scholarship Program (CySP).

DoD CySP Capacity Building Project

In addition to the scholarship recruitment award, IUP received a Capacity Building award for a project titled "An Innovative Pedagogical Approach Based on Agile Methodology for Faculty Development in Cybersecurity".

The goal of this capacity building project is to find additional ways to recruit more students to enter the cybersecurity workforce. This goal will be achieved through a unique blend of faculty development, hands-on workshops, and the continued cultivation of relationships with local community colleges. As a result, this project will hold a number of workshops at surrounding Community Colleges.

Visit the DoD CySP page for more information
www.iup.edu/DoDScholarship

WORKSHOP ACTIVITIES

Introduction to the CySP Program

Hands-on activities using the Raspberry PI

Guest speaker presentations by security experts

Hands-on session on Scrum Team and security of various physical systems (airport, hospitals, etc)

Hands-on activities on threat modelling, attack trees, and misuse cases

WORKSHOP SCHEDULE - DAY 1 — 2/29/20

9:00 a.m. to 9:20 a.m.	**The DoD CySP, CAE program at IUP, and Cybersecurity Activities at IUP** Dr. Waleed Farag, Director, IUP Institute for Cybersecurity
9:20 a.m. to 9:30 a.m.	**BREAK**
9:30 a.m. to 11:30 a.m.	**Introduction to Agile Mindset and Scrum Methodology** Mr. Jeff Pulcini, Agile Coach and Project Manager
11:30 a.m. to 12:30 p.m.	**LUNCH**
12:30 p.m. to 1:40 p.m.	**Hands-on Session: Raspberry Pi and Security Applications** Dr. Waleed Farag, Director, IUP Institute for Cybersecurity
1:40 p.m. to 1:50 p.m.	**BREAK**
1:50 p.m. to 3:00 p.m.	**Hands-On Session: Importance of 5 C's in Agile Teams** Dr. Imran Ghani, Associate Professor of Computer Science, IUP

WORKSHOP SCHEDULE - DAY 2 — 3/7/20

9:00 a.m. to 10:50 a.m.	**Methods to Decompose & Address System Cyber Security Threat Risk** Mr. Nigel Wright, Technical Program Manager, Uber
10:50 a.m. to 11:00 a.m.	**BREAK**
11:00 a.m. to 12:00 p.m.	**Hands-on Session: Scrum Team + Airport and other Physical Entities Security - Iteration 1** Dr. Imran Ghani, Associate Professor of Computer Science, IUP
12:00 p.m. to 12:50 p.m.	**LUNCH**
12:50 p.m. to 1:50 p.m.	**Hands-on Session: Scrum Team + Airport and other Physical Entities Security - Iteration 2** Dr. Imran Ghani, Associate Professor of Computer Science, IUP
1:50 p.m. to 2:00 p.m.	**BREAK**
2:00 p.m. to 3:00 p.m.	**Hands-on Session: Threat Model, Attack Tree + Misuse case on white board & on SeaMonster or PPT** Dr. Imran Ghani, Associate Professor of Computer Science, IUP

Cybersecurity Workshop

http://www.pollev.com/nwright999

Nigel Wright

March 7, 2020
Penn Highlands

Hello!

About Nigel!

➔ **Pittsburgher**
Grew up south of Pittsburgh in California, PA. Parents are fans of British Rock!

➔ **Breaking Computers Since 1989**
The best way to fix something is to break it first!

➔ **Working on Robot Cars!**
Previous roles involved creating product lines for Automated Rail Signaling

Agenda

Hour 1

- Cyber Security in Industrial Systems
- System Analysis 101
- Examples of System Exploits
- Identifying & dealing with Risks & Vulnerabilities
- Speed Reading with Program Management Techniques

<10 Minute BREAK>

Hour 2

- Exercise & Group Work
  - Overview of an example of Theoretical Airport Security System Design by generating set of Risks
  - Group Exercise
  - Group Review of Exercise

How are you feeling today?

—

Agenda;

Cyber Security in Industrial Systems
System Analysis 101
Examples of System Exploits
Identifying & dealing with Risks & Vulnerabilities
Speed Reading with Program Management Techniques

What is an industrial system?

Knowledge of Industrial Systems?

Extremely knowledgeable

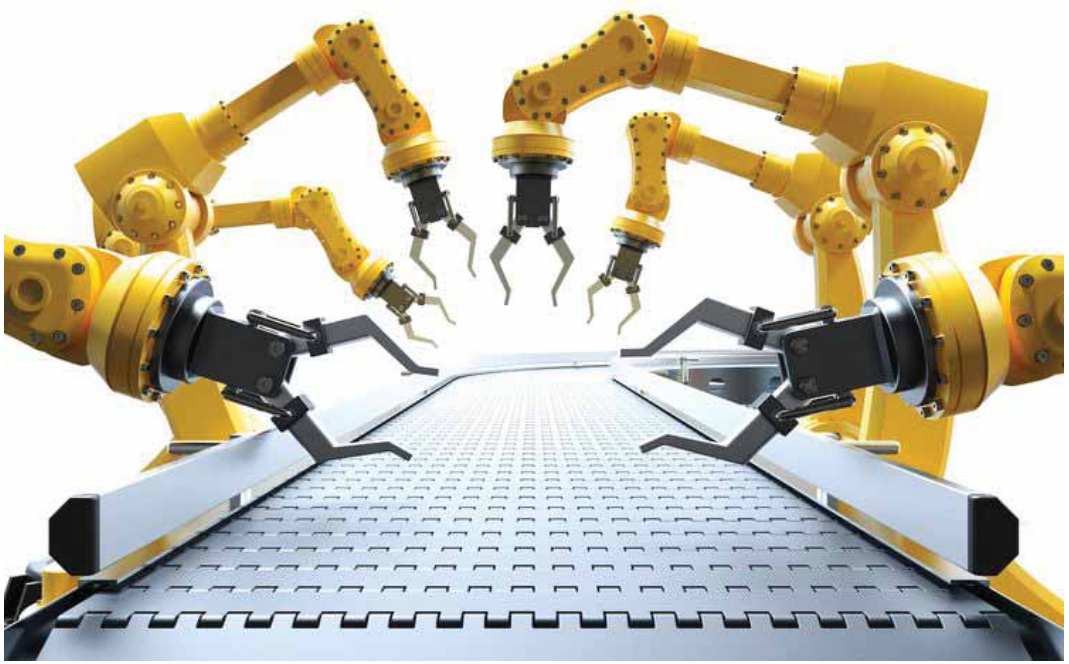
Not knowledgeable at all

Neutral

Industrial Control System (def)

Industrial control system (ICS) is a collective term used to describe different types of control systems and associated instrumentation, which include the **devices**, **systems**, **networks**, and controls used to operate and/or automate industrial processes.

Industrial Control System (def)



Made up of *many* items, each with it's own design life, update cycle, and iterations.

Used by highly skilled and non skilled technicians.

Low -> No Tolerance for Failures


< 3.5 minutes frequency

What type of cyber security risks would be present in this system?

Networking

Misuse

Unintended design

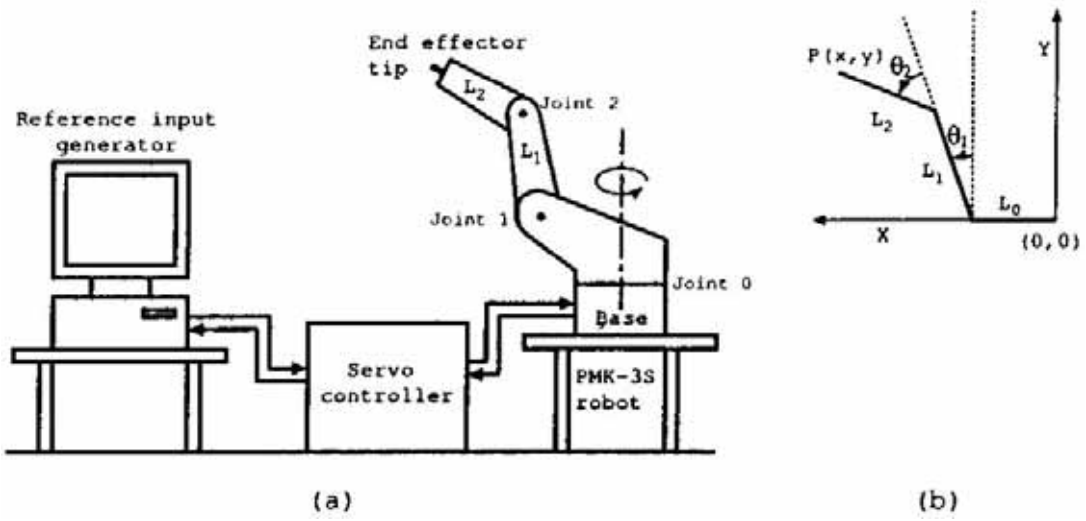
Malware

Zero-day exploit

Man in the middle

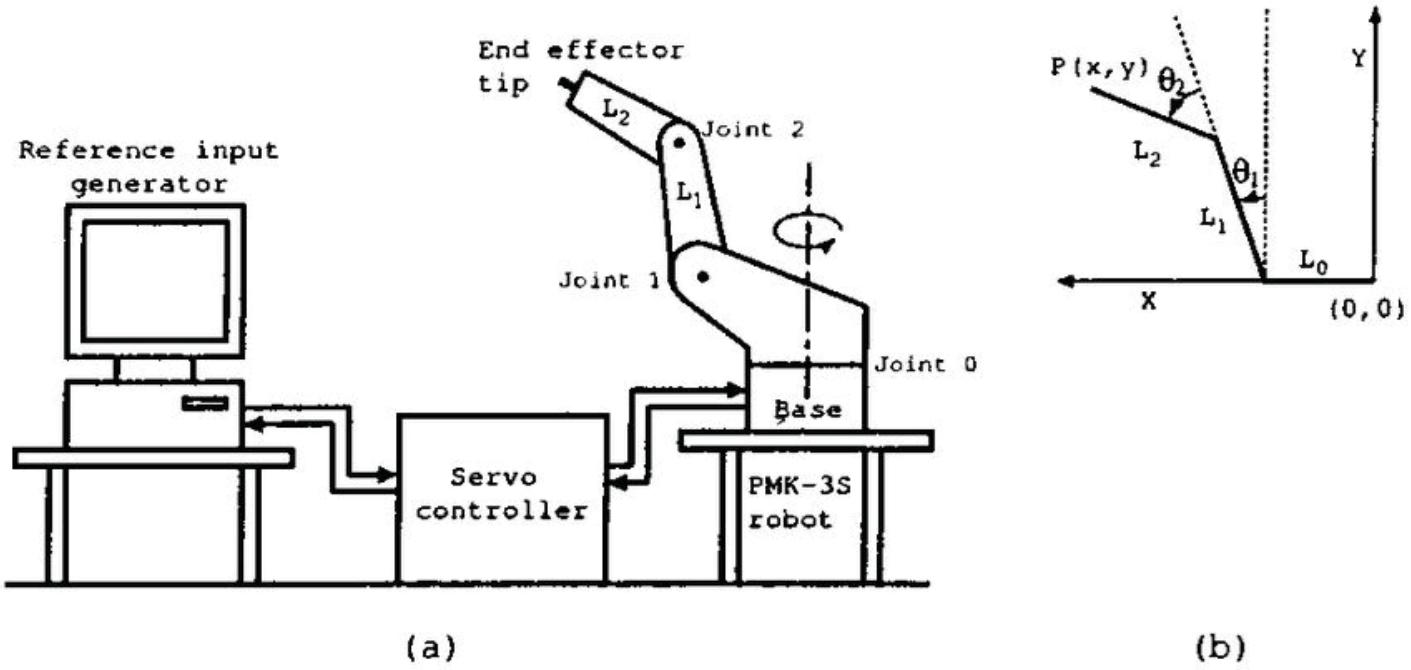
It depends

Systems Engineering



Systems engineering is an interdisciplinary field of engineering and engineering management that focuses on how to design and manage complex systems over their life cycles.

Systems Engineering & Cybersecurity



What is vulnerable in this diagram?

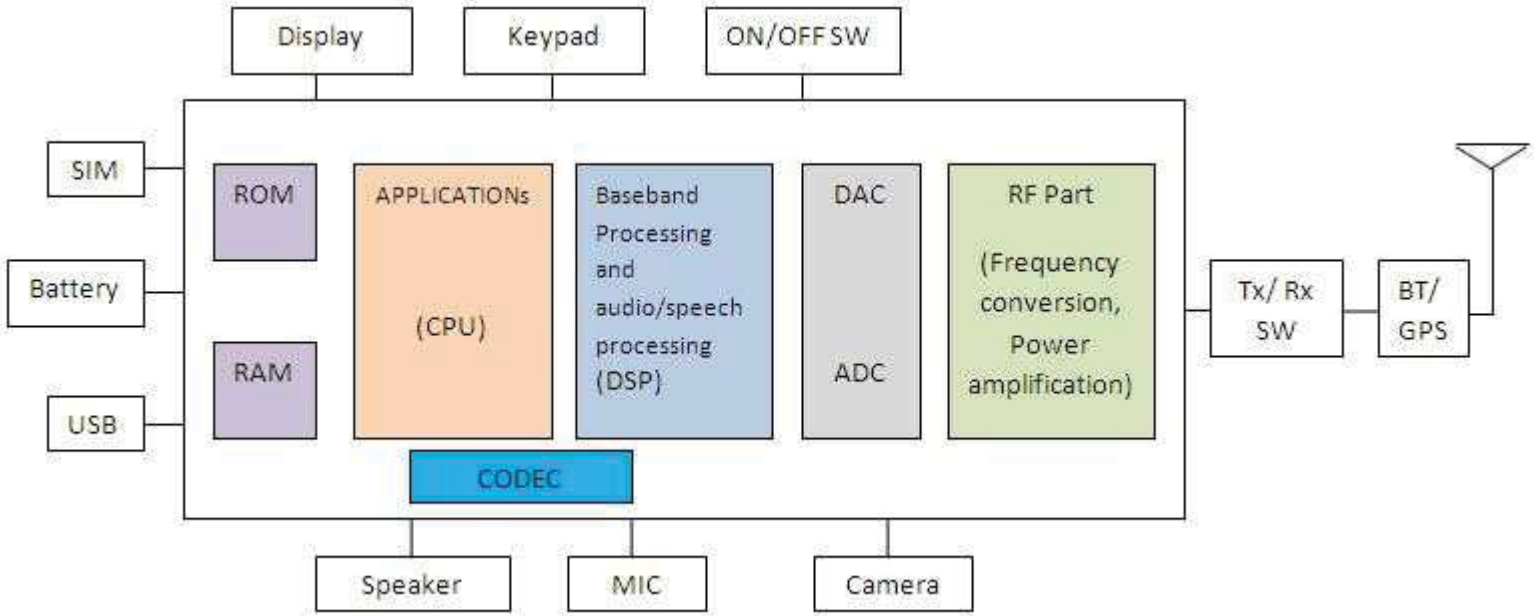
—

Agenda;

Cyber Security in Industrial Systems
System Analysis 101
Examples of System Exploits
Identifying & dealing with Risks & Vulnerabilities
Speed Reading with Program Management Techniques

Decomposing a System

Decomposing System



What is this System?

—

Agenda;

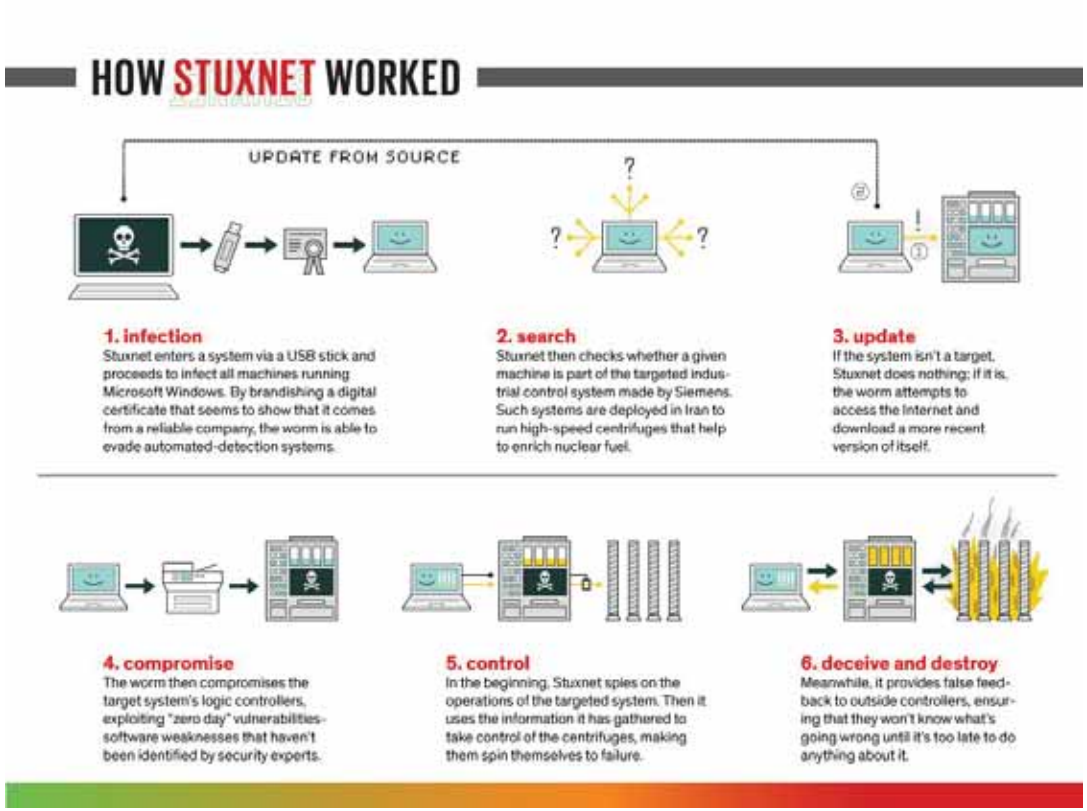
Cyber Security in Industrial Systems
System Analysis 101
Examples of System Exploits
Identifying & dealing with Risks & Vulnerabilities
Speed Reading with Program Management Techniques

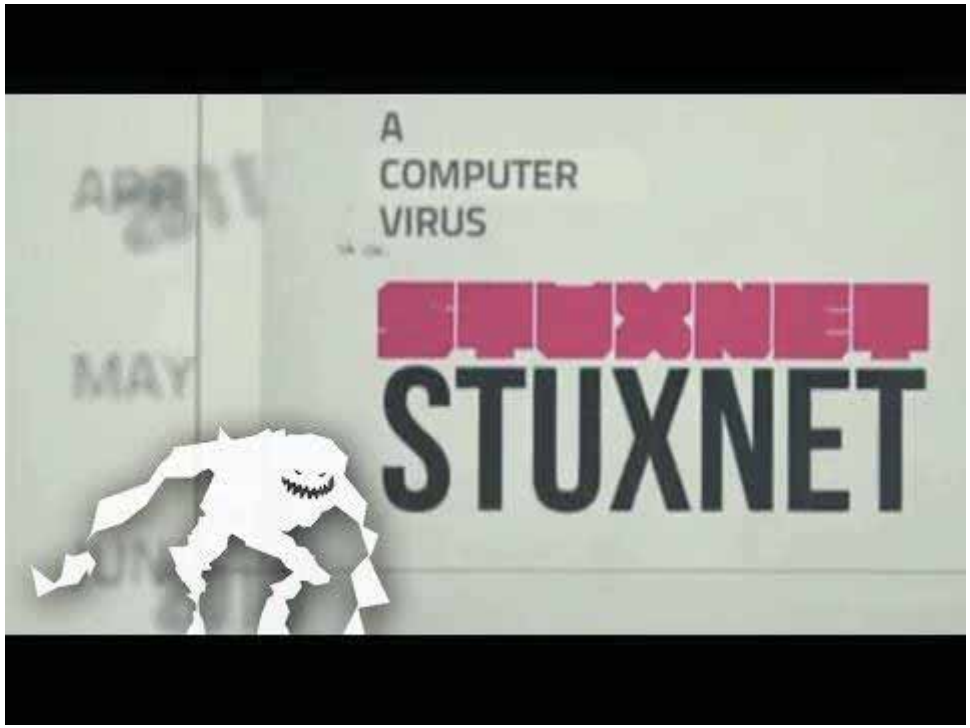
Malicious actors vs. Bad Design

Stuxnet

- Stuxnet is a malicious computer worm, first uncovered in 2010
- Targets SCADA systems and is believed to be responsible for causing substantial damage to Iran's nuclear program.
- Although neither country has openly admitted responsibility, the worm is widely understood to be a jointly built American/Israeli cyberweapon

How did STUXNET get in?




A
COMPUTER
VIRUS
STUXNET
STUXNET

2003 Cascading Blackout

- The Northeast blackout of 2003 power outage through United States, and the Canadian
- August 14–28, 2003, beginning just after 4:10 p.m. EDT. Some power was restored by 11 p.m.
- Most did not get their power back until two days later. In other areas, it took nearly a week or two for power to be restored.
- At the time, it was the world's second most widespread blackout in history,

2003 Blackout

What would be your first response?

Tesla Lane Monitoring

- Tesla Model S comes with Advanced Lane Assistance Systems with their 2014 release.
- Uses the front facing cameras and computer vision system to recognize the lanes.
- The system beeps and the steering wheel vibrate, alerting the driver of an unintended lane change.

How do we design against adversarial use?

—

Agenda;

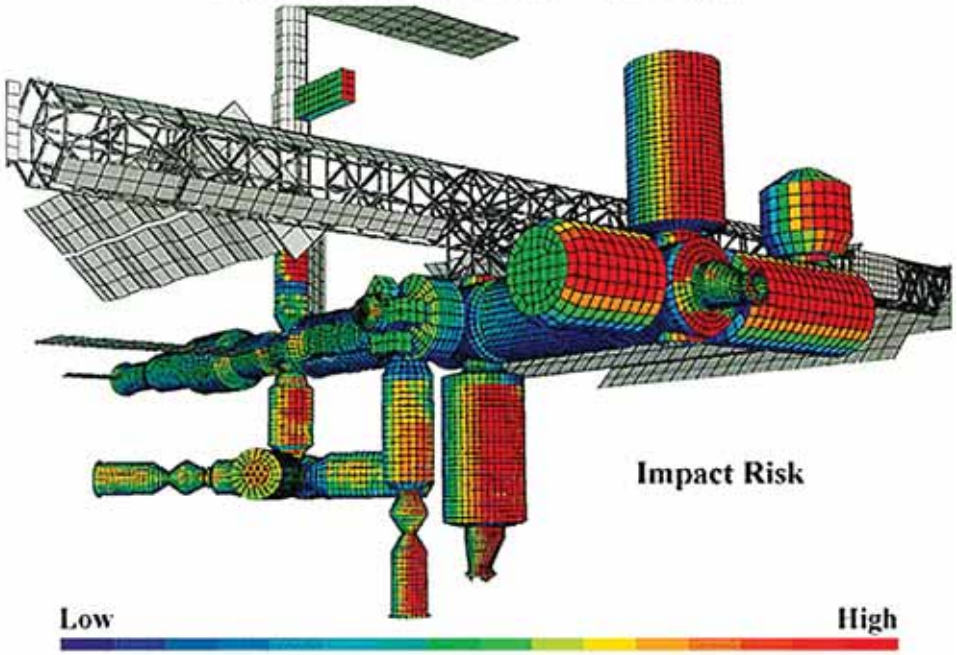
Cyber Security in Industrial Systems
System Analysis 101
Examples of System Exploits
Identifying & dealing with Risks & Vulnerabilities
Speed Reading with Program Management Techniques

As an engineer you need to embrace risk based thinking!

Focus your efforts on those that are most needed!

International Space Station

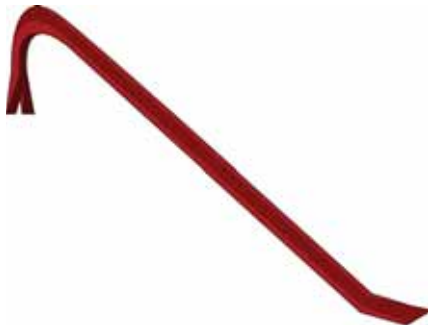
Probability of No Impacts From a > 1 cm Ø Debris



Everyday elements can be misused, have exploits and present vulnerabilities!

What is this?

Risk: Design Misuse!



What types of screwdriver misuse can you think of?

Marketplace Misuse!

—

Agenda;

Cyber Security in Industrial Systems
System Analysis 101
Examples of System Exploits
Identifying & dealing with Risks & Vulnerabilities
Speed Reading with Program Management Techniques

Examples of Project's you've worked on?

Program Management 101

What is a project?

What is a project?

Large body of work with specific deliverables

Constraints driven

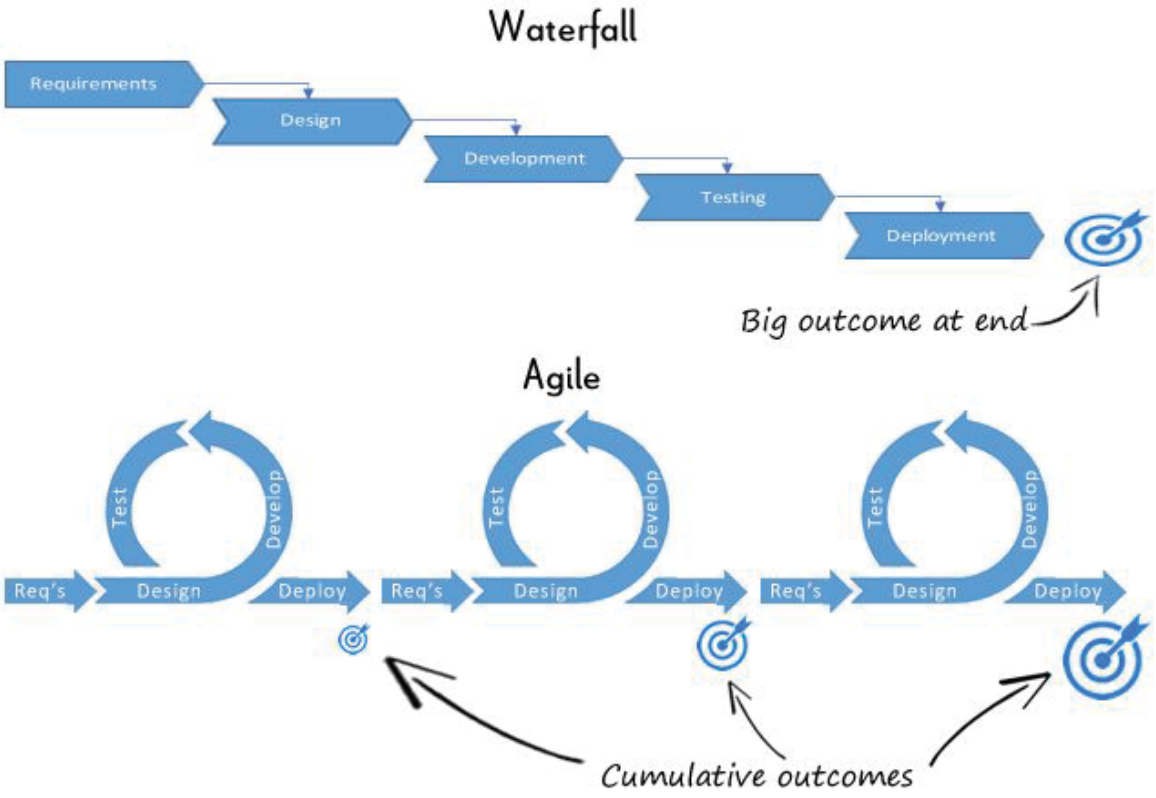
Basic; Time, Quality, Cost

6(+ Risk, Opportunity, Scope)

Collection of stakeholders

Like it or not, you have all worked on a project in your life?

Waterfall vs. Agile Project Methods



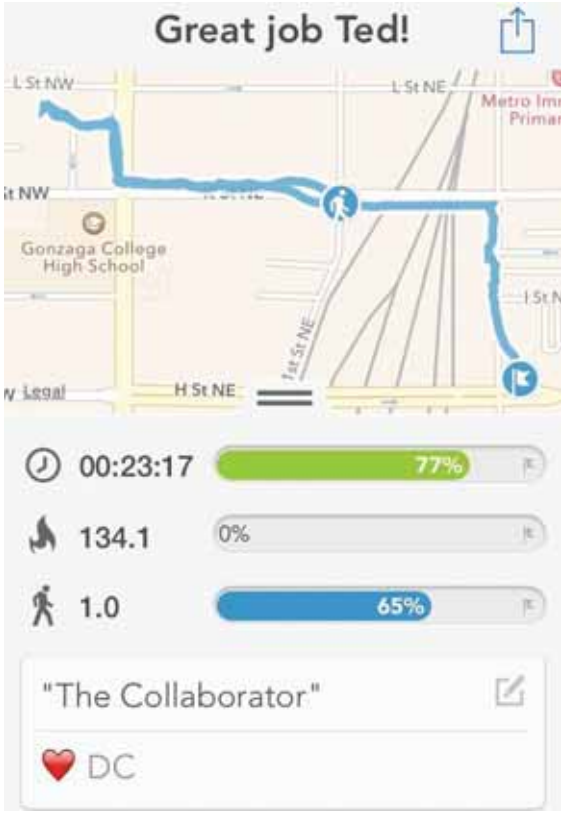
Not all projects are equal!

Some are sprints, some are marathons. The constraints will inform your management approach

What methodology would you use?

Project:
Create a calorie tracking app for seniors

Constraints;
Duration: 9 Weeks
Budget; $1,000
Quality; 1 Demo with Investors



Which Methodology

Waterfall

Agile

What methodology would you use?

Project:
Upgrade existing steel chemistry reporting system

Constraints;
Duration: 15 Weeks
Budget; $100,000
Quality; 0 Missed Reports for initial production run (100 coils of steel)

Which Methodology PT 2

Agile

Waterfall

Kanban

Kanban (看板) (signboard or billboard in Japanese) is a scheduling system for lean manufacturing and just-in-time manufacturing (JIT). Taiichi Ohno, an industrial engineer at Toyota, developed kanban to improve manufacturing efficiency. Kanban is one method to achieve JIT.The system takes its name from the cards that track production within a factory.

Kanban became an effective tool to support running a production system as a whole, and an excellent way to promote improvement. Problem areas are highlighted by measuring lead time and cycle time of the full process and process steps. One of the main benefits of kanban is to establish an upper limit to work in process inventory to avoid overcapacity.

Simplified Kanban Board

Kanban & you

Agenda

~~Hour 1~~

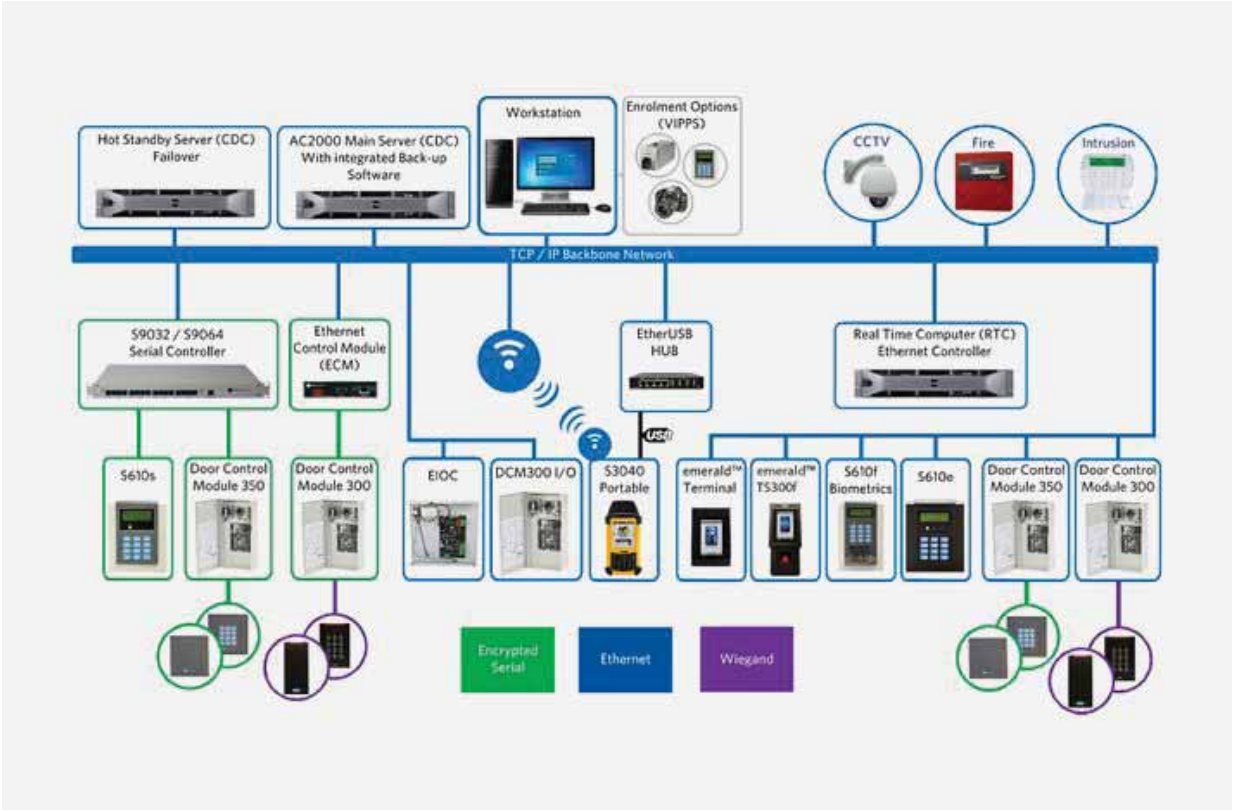
- ~~Cyber Security in Industrial Systems~~
- ~~System Analysis 101~~
- ~~Examples of System Exploits~~
- ~~Identifying & dealing with Risks & Vulnerabilities~~
- ~~Speed Reading with Program Management Techniques~~

~~<10 Minute BREAK>~~

Hour 2

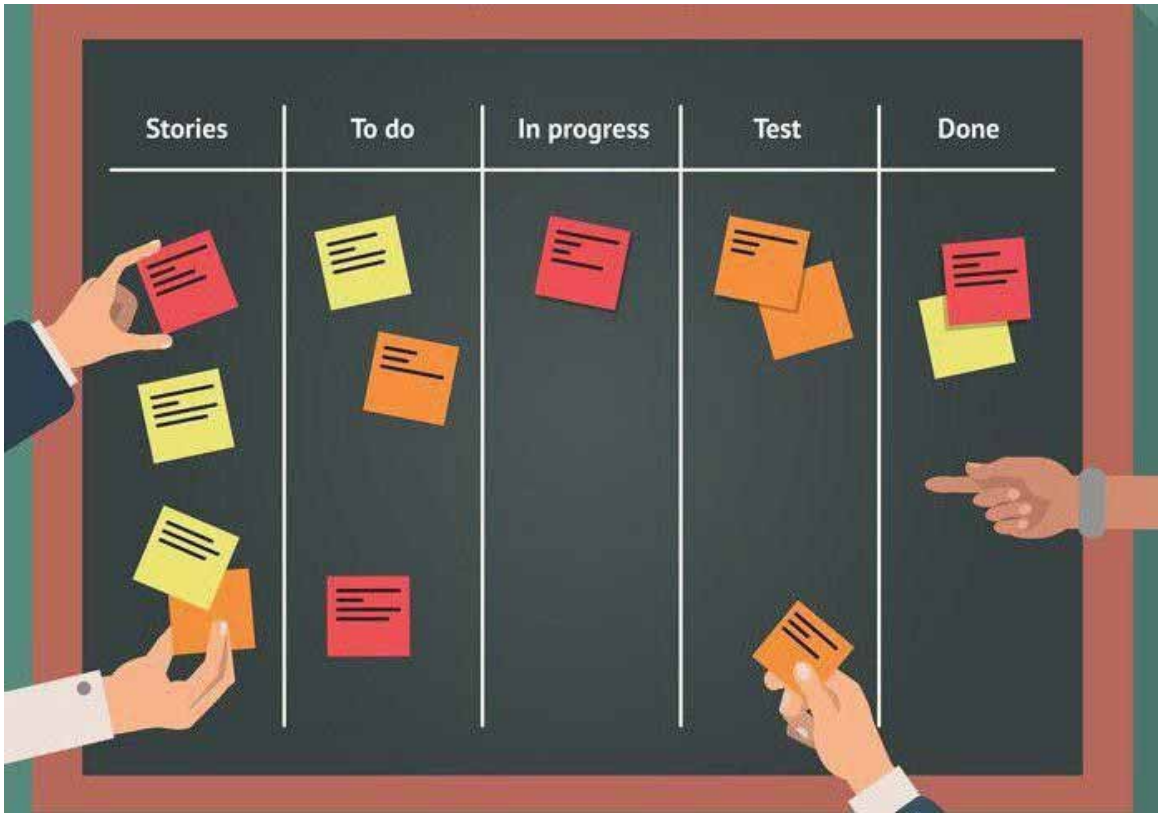
- Exercise & Group Work
  - Overview of an example of Theoretical Airport Security System Design by generating set of Risks
  - Group Exercise
  - Group Review of Exercise

Airport Control System - System Decomp



Airport Control System - Risk Generation

Airport Control System - Kanban Risk Priority



Airport Control System - Kanban Risk Mitigations

An Introduction to Agile/Scrum

Jeff Pulcini

Cyber Security Workshop

February 29, 2020

Today’s Goals

Give you the big picture, concepts, and keywords of Agile/Scrum

- Contrast Agile with traditional waterfall methods
- Answer why we should care?

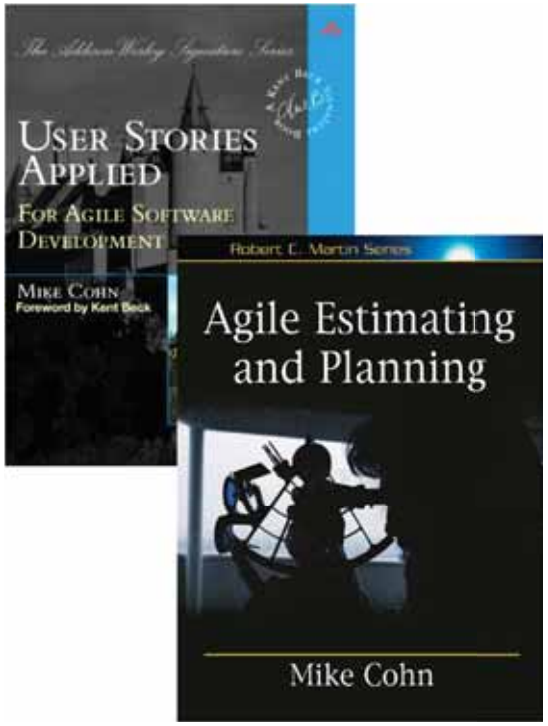
Ground Rules

I’m not going to be rigorous in history or definitions.

I’m likely to make extreme statements to make the point.

We will talk software development, but Agile can be used for anything.

CREDITS



Base presentation was done by:
Mike Cohn (circa 2007)
mike@mountaingoatsoftware.com
www.mountaingoatsoftware.com
(720) 890-6110 (office)

Other portions are credited as appropriate.

Additional material by Jeff Pulcini

Mountain Goat Software, LLC

Problem Statement

What we have been doing is not working.

We are faced with…

- Producing more and better output with shrinking budgets
- Maximize the actual and perceived value we deliver
- Keep up with the pace of change in the market

How did we get here?

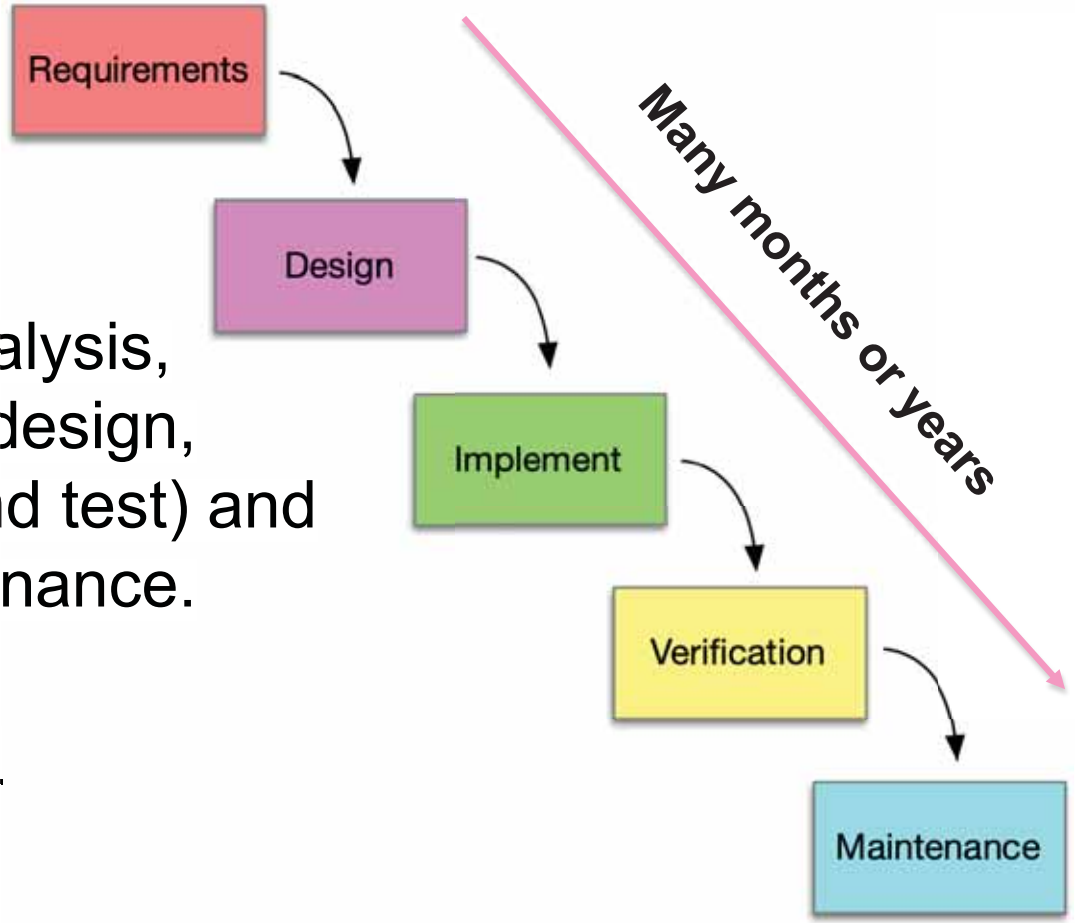
Adapted from a presentation by Evan Campbell, Slide 32
http://agilecommons.org/files/4e9f355ad9/Agile_Fncl_Impact_Slides.pdf

Waterfall Project Management Methodology

- A step-wise approach to product delivery

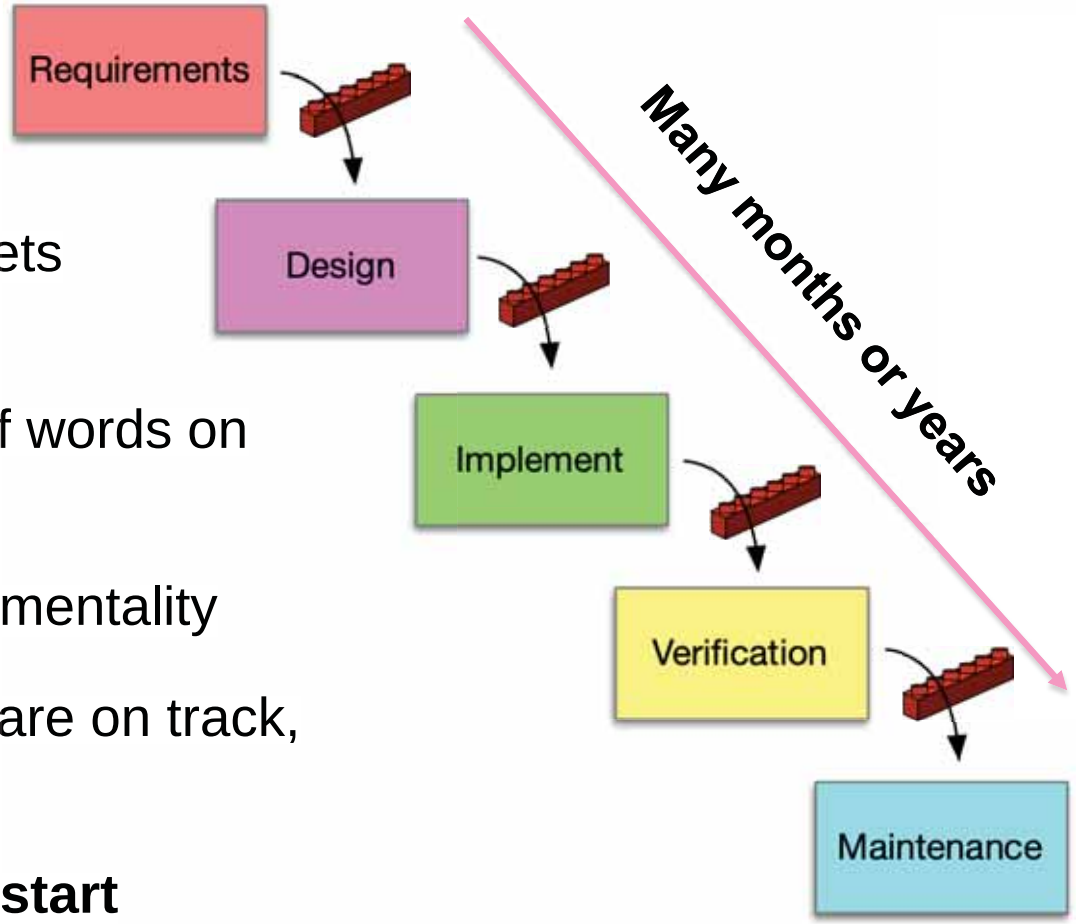
- It is a or relay race of analysis, requirements definition, design, Implementation (code and test) and then delivery and maintenance.

- Product delivery is a "big bang"/"all or nothing"

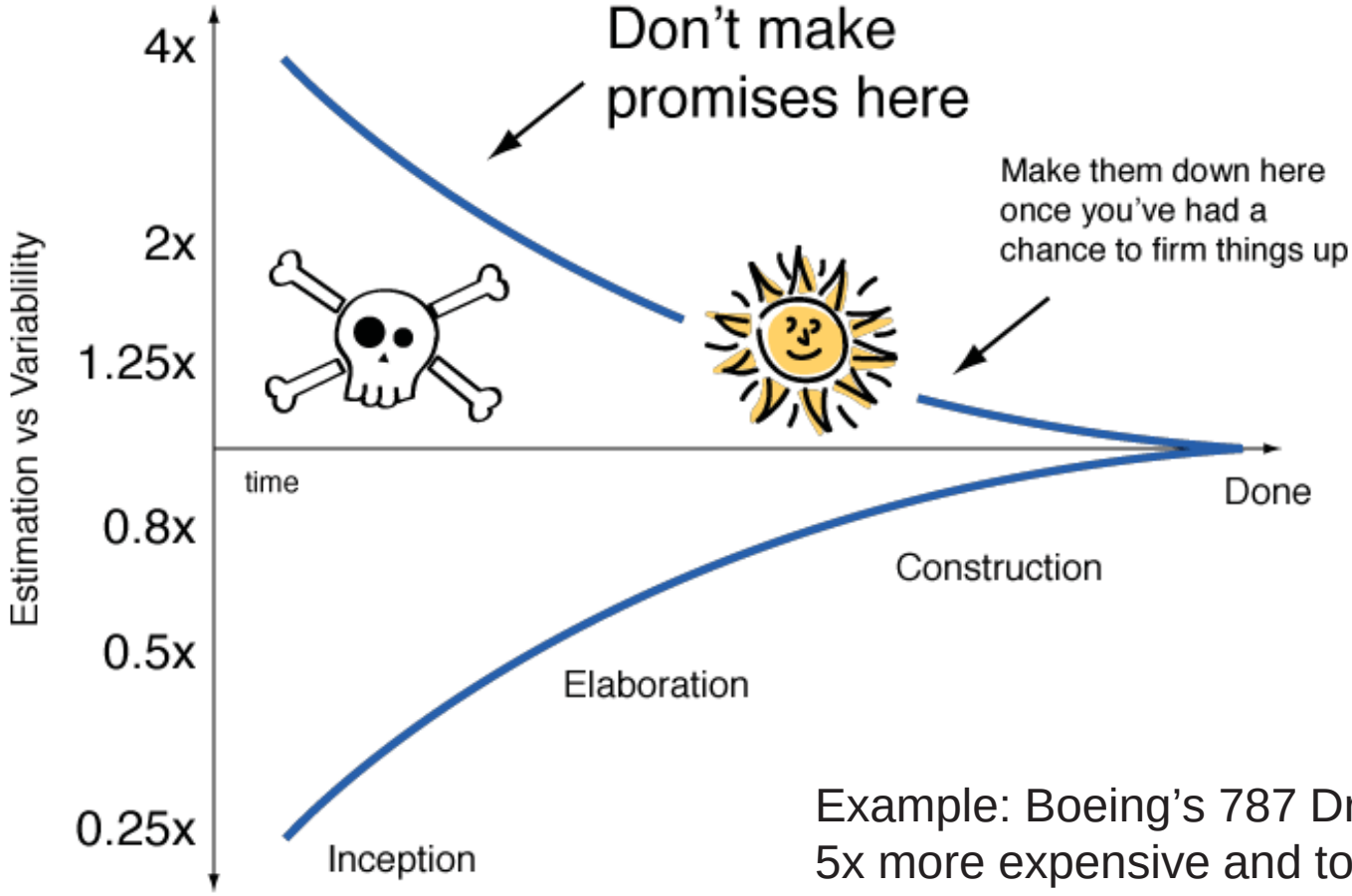


Downside of This Approach

- Focus is primarily on process, not people
- Long development cycles
- Unresponsive to changing markets (and thus users needs)
- Formal communications, Lots of words on paper
- Each step fosters a them vs. us mentality
- Plan based - We measure if we are on track, not what we have done
- **You know the least when you start**



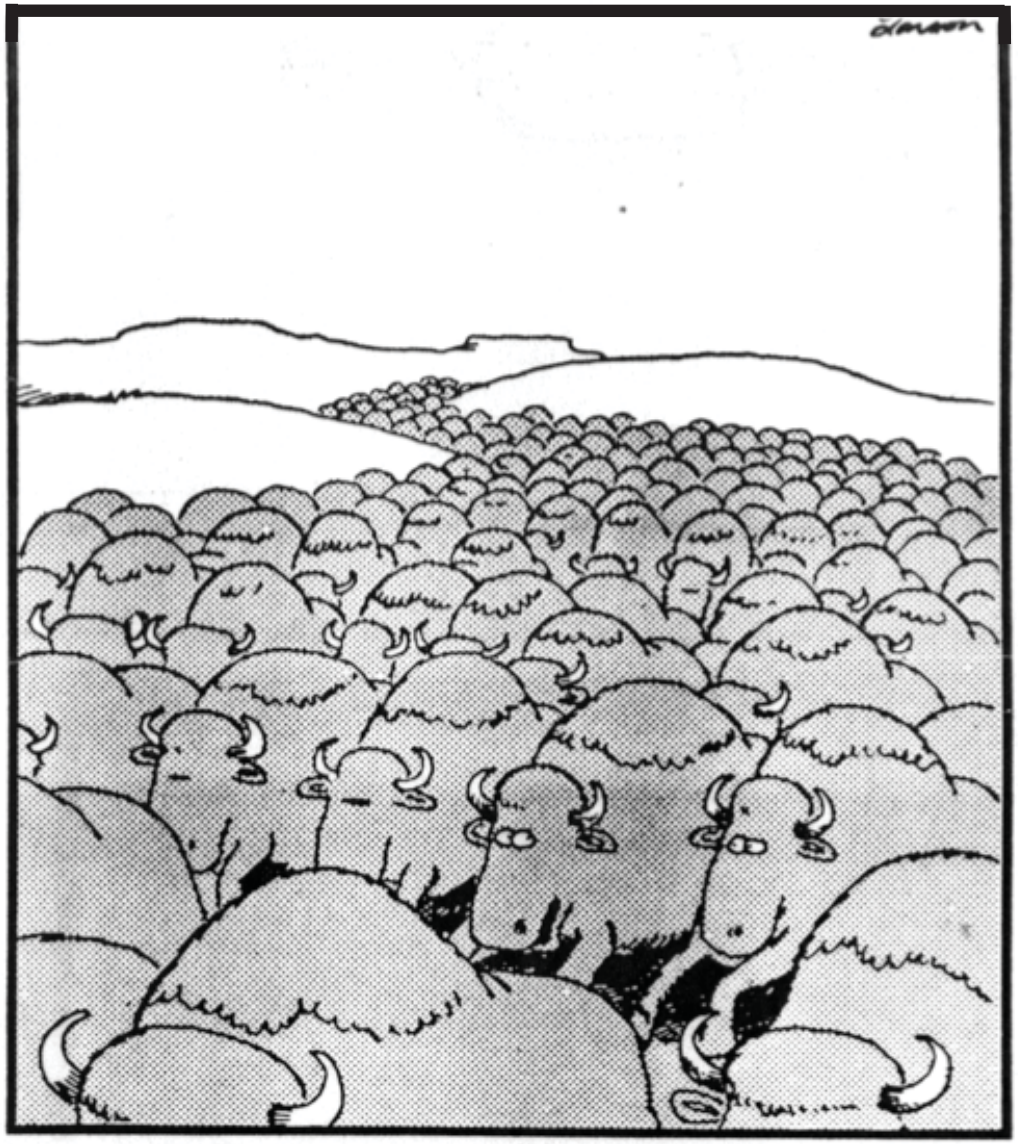
Cone of Uncertainty



Example: Boeing's 787 Dreamliner was 5x more expensive and took twice as long to deliver than original estimates.

As described by Steve McConnel, Software Estimation: Demystifying the Black Art

You know the least when you start your project



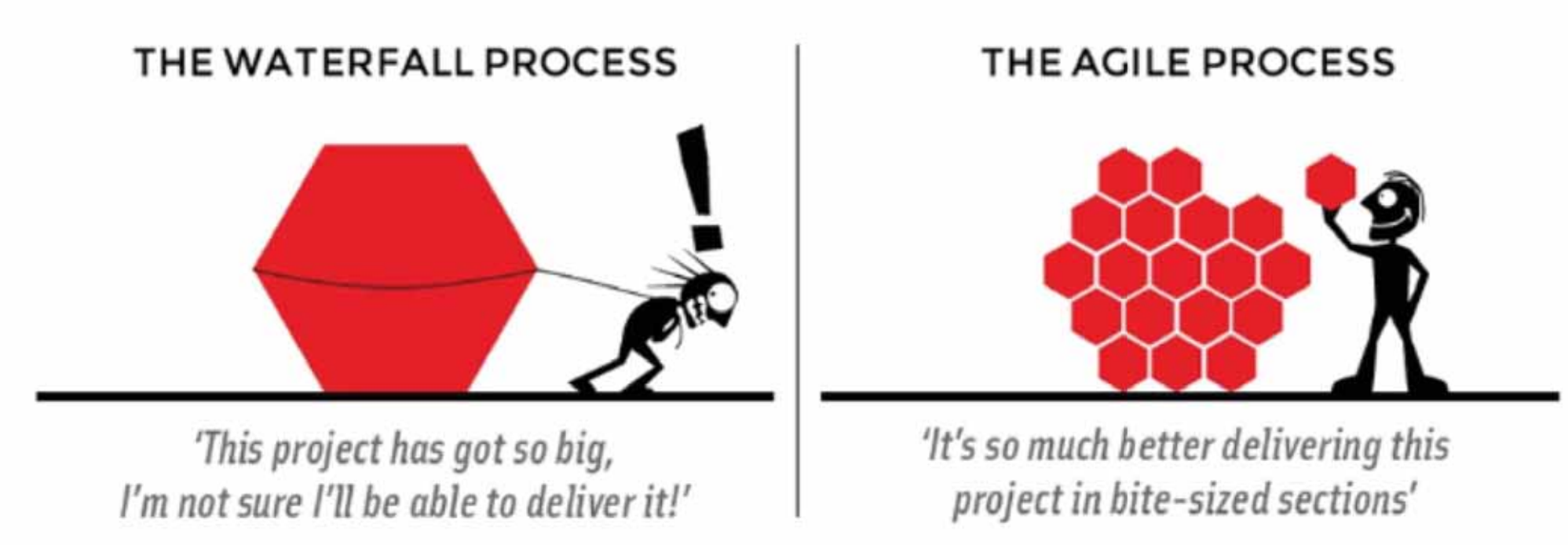
"As if we all knew where we're going."

We’re losing the relay race

“The… ‘relay race’ approach to product development…may conflict with the goals of maximum speed and flexibility. Instead a holistic or ‘rugby’ approach—where a team tries to go the distance as a unit, passing the ball back and forth—may better serve today’s competitive requirements.”

Hirotaka Takeuchi and Ikujiro Nonaka, “The New New Product Development Game”, *Harvard Business Review*, January 1986.

Waterfall vs. Agile



From various sources from the internet

Process Comparison

- At a high level, *both processes are equivalent*
- The *difference* is in *execution and philosophy*
- Waterfall is Command and Control - Agile is about communications and personal responsibility
- Agile and Scrum are Empirical Project Management
  - Based on Statistical Process Control (Shewhart and Deming) and Lean Manufacturing
  - Frequent Inspect and Adapt Cycles

Agile

Some definitions
Changing our mindset

The Agile Manifesto

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

Individuals and interactions	over	**Process and tools**
Working software	over	**Comprehensive documentation**
Customer collaboration	over	**Contract negotiation**
Responding to change	over	**Following a plan**

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

Source: www.agilemanifesto.org

12 Agile Principles

1. **Our highest priority is to satisfy the customer** through early and continuous delivery of valuable software.

2. **Welcome changing requirements**, even late in development. Agile processes harness change for the customer's competitive advantage.

3. **Deliver working software 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**.

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 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.**

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.

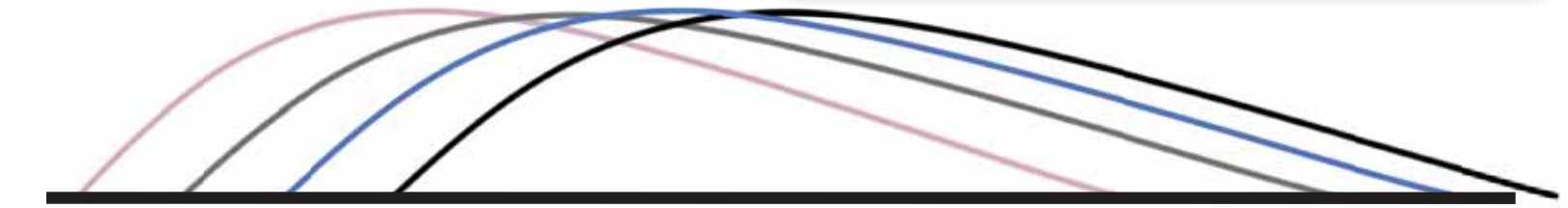
Source: http://agilemanifesto.org/principles.html

Sequential vs. overlapping development

Requirements | Design | Code | Test

Rather than doing all of one thing at a one time...

...Scrum teams do a little of everything all the time



Source: "The New New Product Development Game" by Takeuchi and Nonaka. *Harvard Business Review*, **January 1986.**

Scrum – The Big Picture

The Big Picture

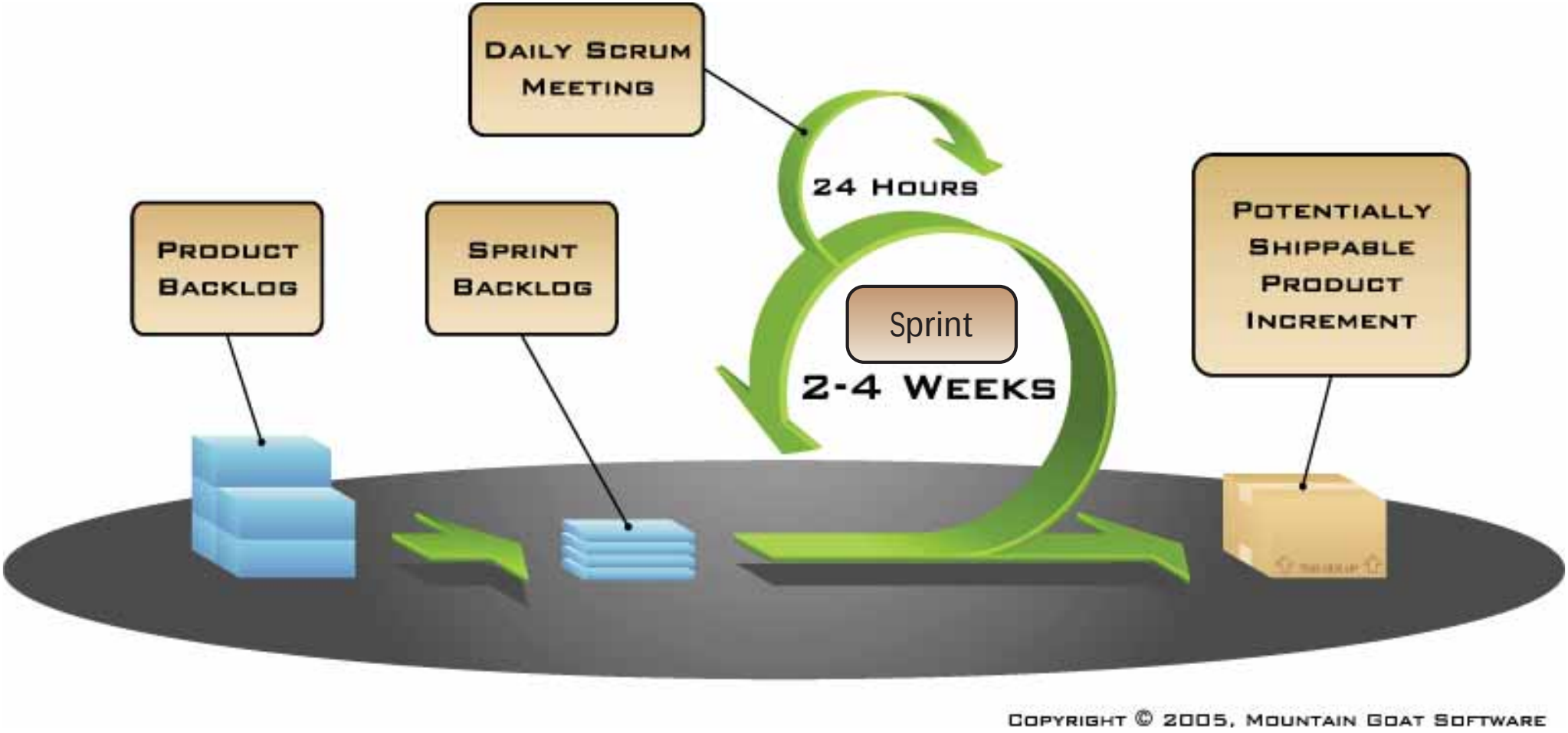
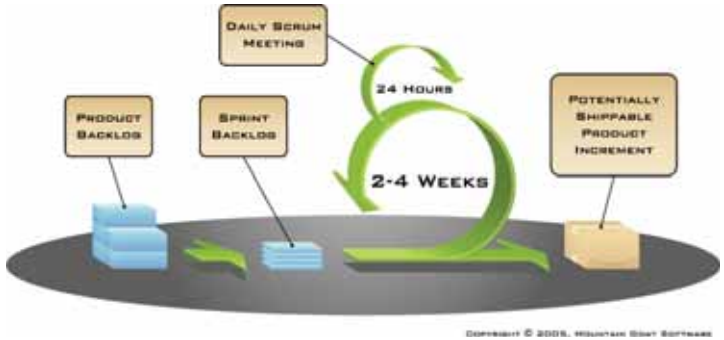


Image available at www.mountaingoatsoftware.com/scrum

Characteristics



- Requirements are captured as items in a list of “product backlog”
- Product progresses in a series of short “sprints”
- Self-organizing teams
- No specific engineering practices prescribed
- Uses generative rules to create an agile environment for delivering projects

Generative Rules

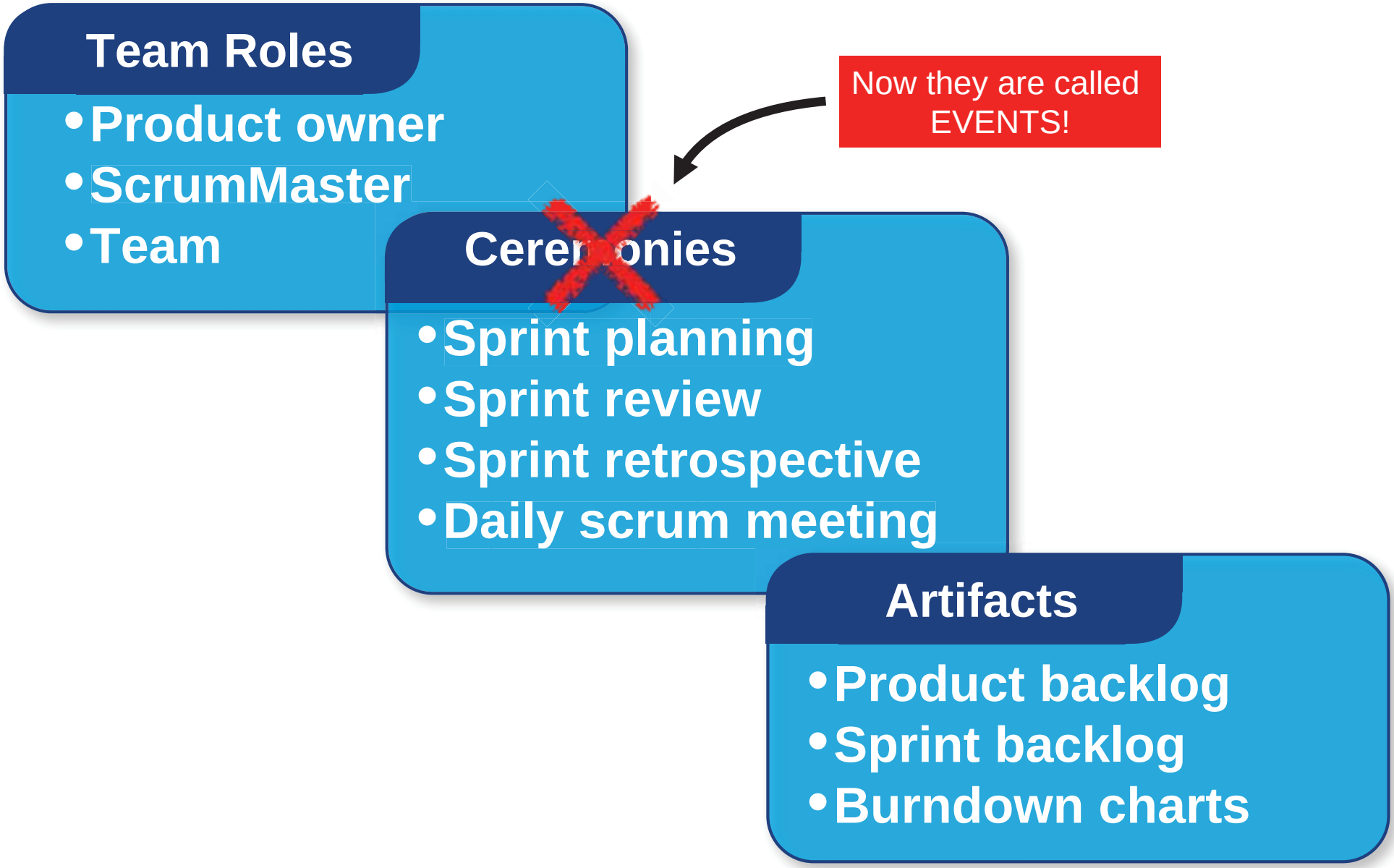
- Think of the word “general”. Dee Hock, former CEO of Visa said.

  “Simple, clear purpose and principles give rise to complex and intelligent behavior. Complex rules and regulations give rise to simple stupid behavior.”

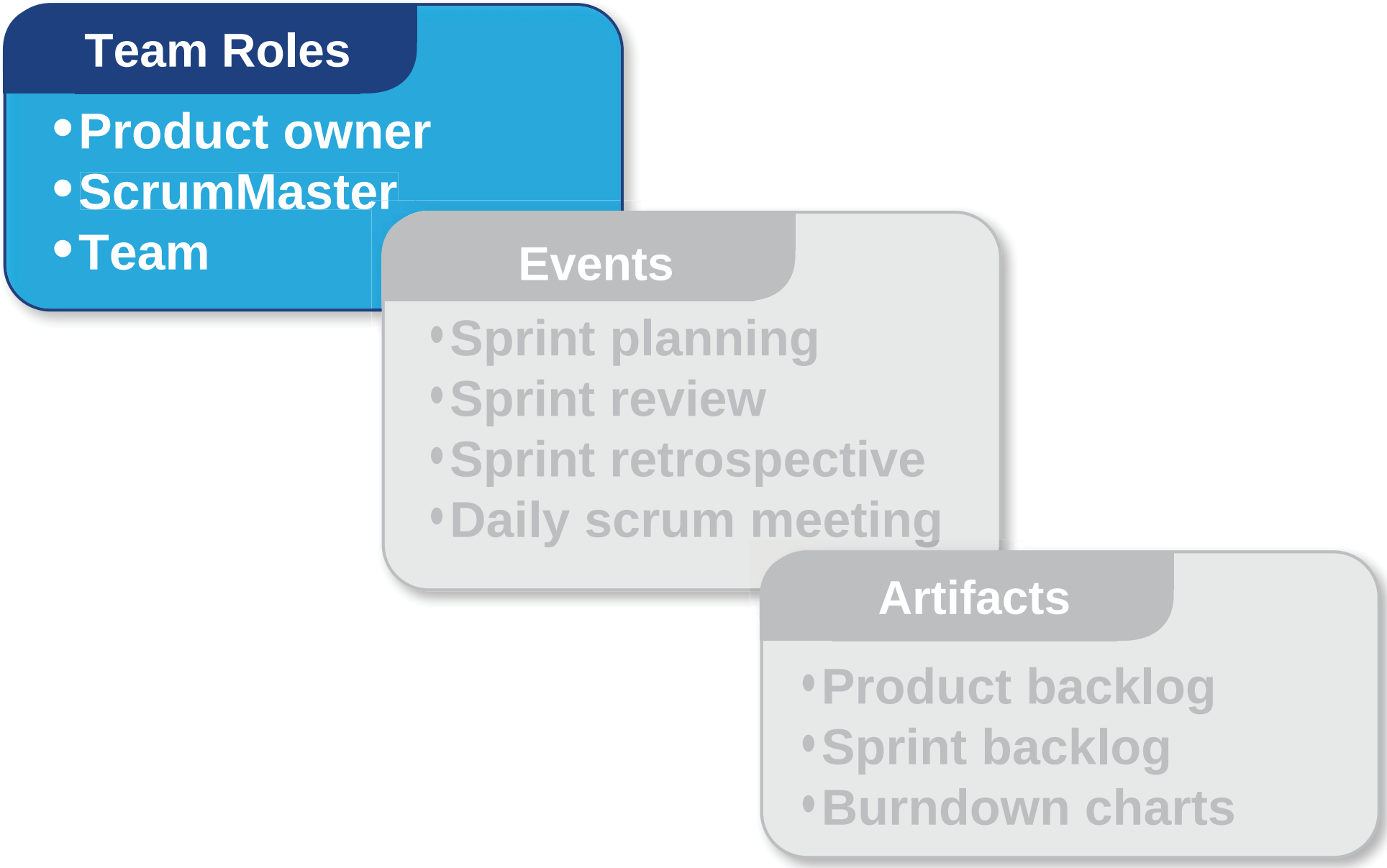
- Jim Donehey, former CIO of Capital One used four rules to help ensure everyone was working toward the same shared goals:
  - **Always align IT with the activities of the business**
  - **Use good economic judgment**
  - **Be flexible**
  - **Have empathy for the other in the organization**

Scrum Details

Scrum Framework



Scrum Framework



Product Owner

- Define the features of the product
- Decide on release date and content
- Be responsible for the profitability of the product (ROI)
- Prioritize features according to market value
- Adjust features and priority every iteration, as needed
- Accept or reject work results

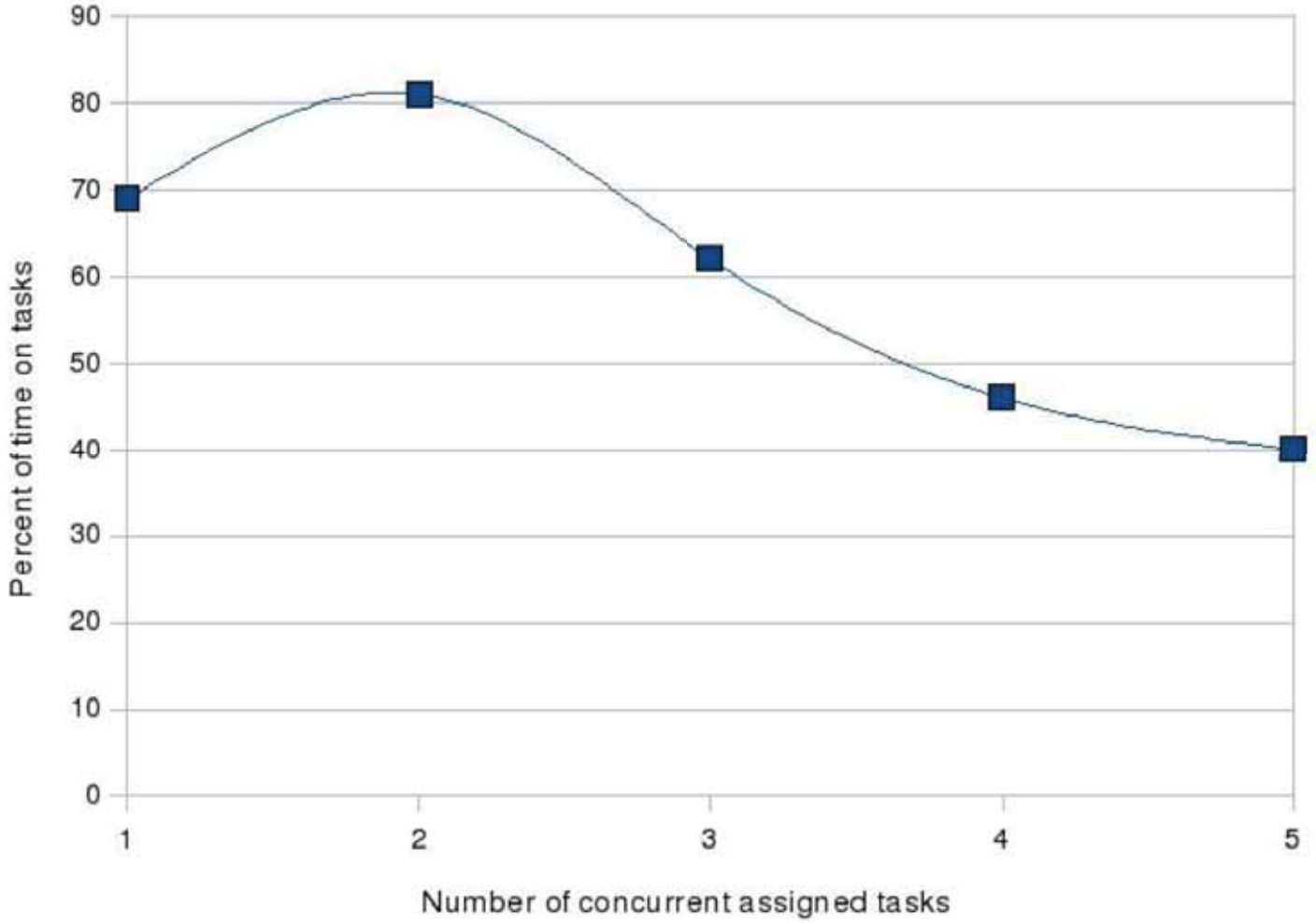
The Scrum Master

- Represents management to the project
- Responsible for enacting Scrum values and practices
- Removes impediments
- Ensure that the team is fully functional and productive
- Enable close cooperation across all roles and functions
- Shield the team from external interferences
- The ScrumMaster differs from a Project Manager in that he does not exercise command and control

The Team

- Typically 5-9 people
- Cross-functional:
  - Programmers, testers, user experience designers, etc.
- Members should be full-time (no multi-tasking!)
  - May be exceptions (e.g., database administrator)
- Teams are self-organizing
  - Ideally, no titles but rarely a possibility
- Membership should change only between sprints

The Myth of Multitasking



from a 1990's Harvard Study by Steven C.Wheelwright and Kim B.Clark

Testing Multitasking

1. Take paper and pen and prepare to write down the following in three columns HORIZONTALLY.

   A a 1 THEN
   B b 2
   C c 3
   -------continue until Z, z and 26---------
   Z z 26

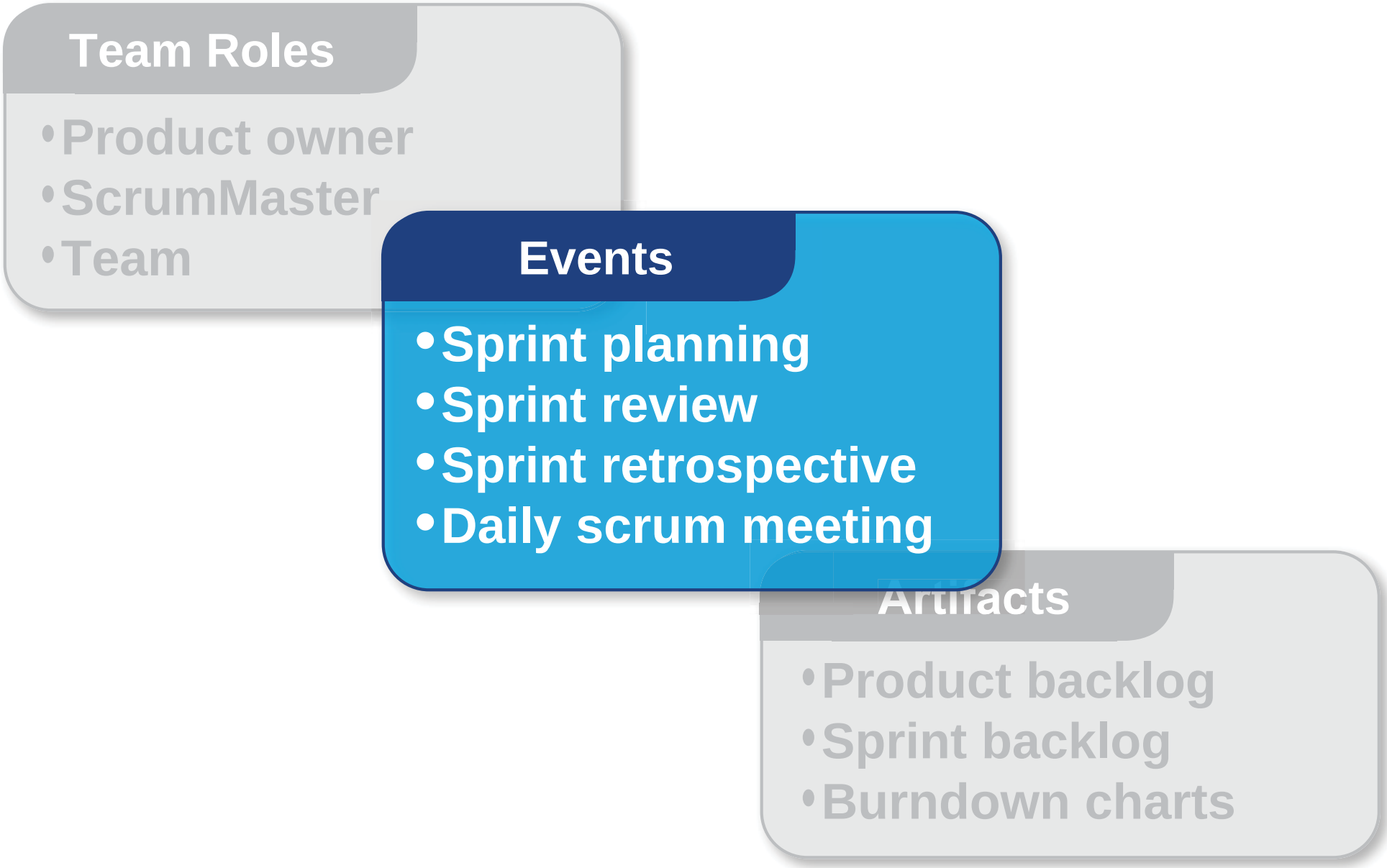
2. Everybody turns on stop watch using their smart phone and begin
3. When done, record your time.

4. Reset stop watch and repeat the same exercise, BUT this time go VERTICALLY.
   Complete capital A to Z first, then go for a-z, and then 1-26.
5. When done, record your time.

Was There a Difference?

From Jeff Sutherland's book *Scrum: The Art of Doing Twice the Work in Half the Time*

Scrum framework



Sprint Planning

Team capacity

Product backlog

Business conditions

Current product

Technology

Sprint planning meeting

Sprint prioritization

- Analyze and evaluate product backlog
- Select sprint goal

Sprint planning

- Decide how to achieve sprint goal (design)
- Create sprint backlog (tasks) from product backlog items (user stories / features)
- Estimate sprint backlog in hours

Sprint goal

Sprint backlog

The Sprint Goal

- A short statement of what the work will be focused on during the sprint

Life Sciences

Support features necessary for population genetics studies.

Database Application

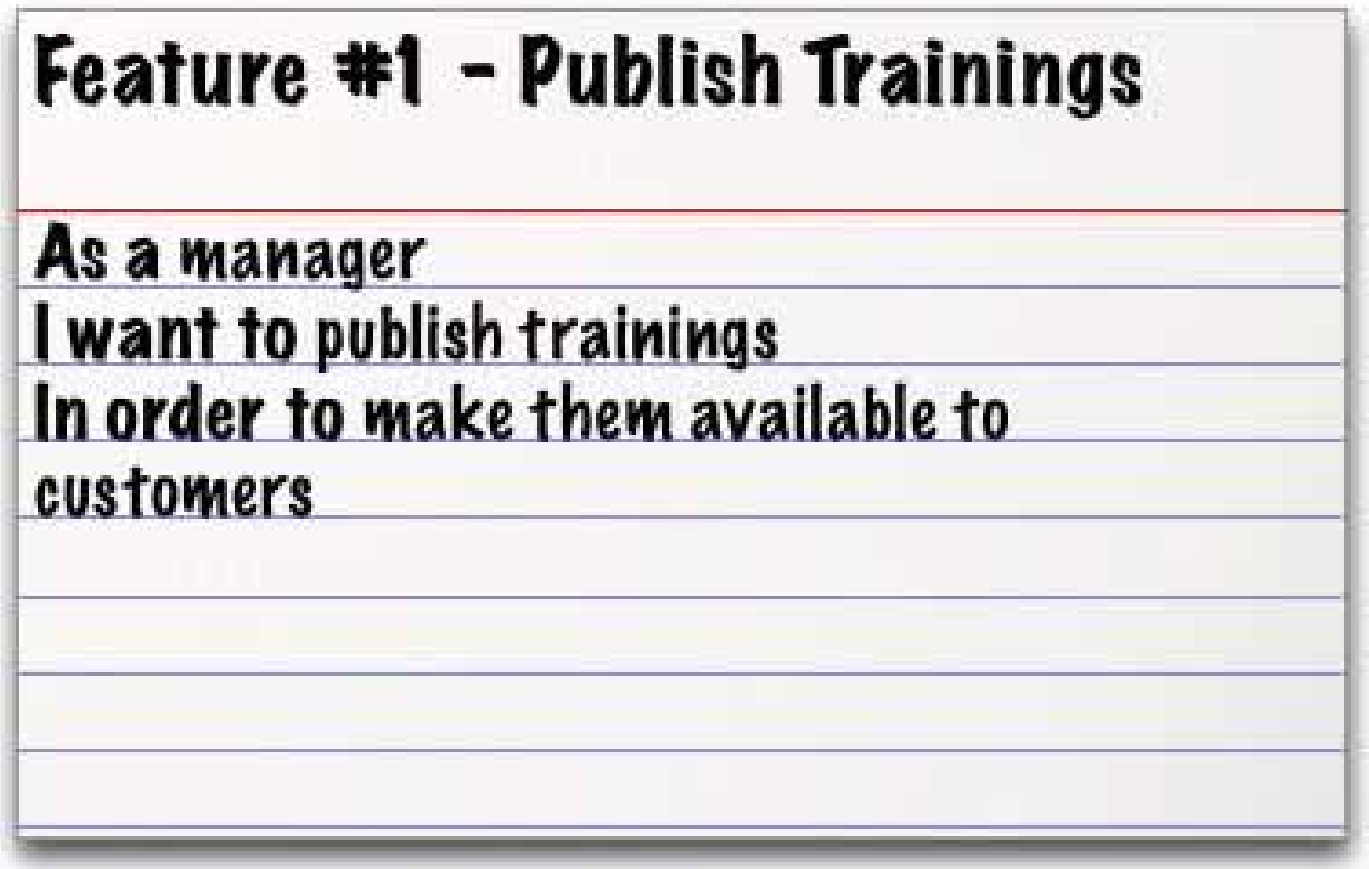
Make the application run on SQL Server in addition to Oracle.

Financial services

Support more technical indicators than company ABC with real-time, streaming data.

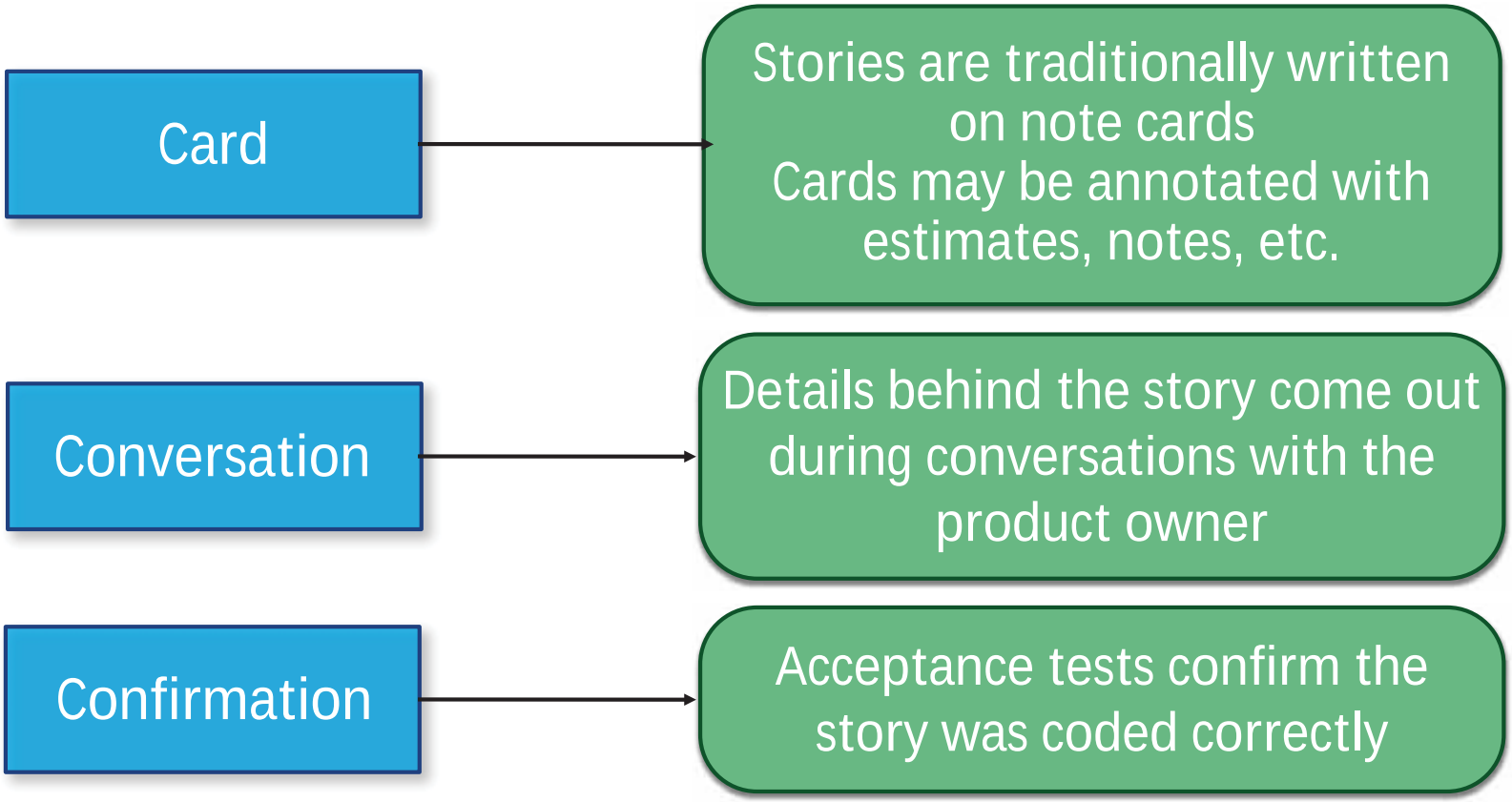
User Stories

Who
What
Why



What is a User Story

A user story describes functionality that will be valuable to either a user or purchaser of a system or software*

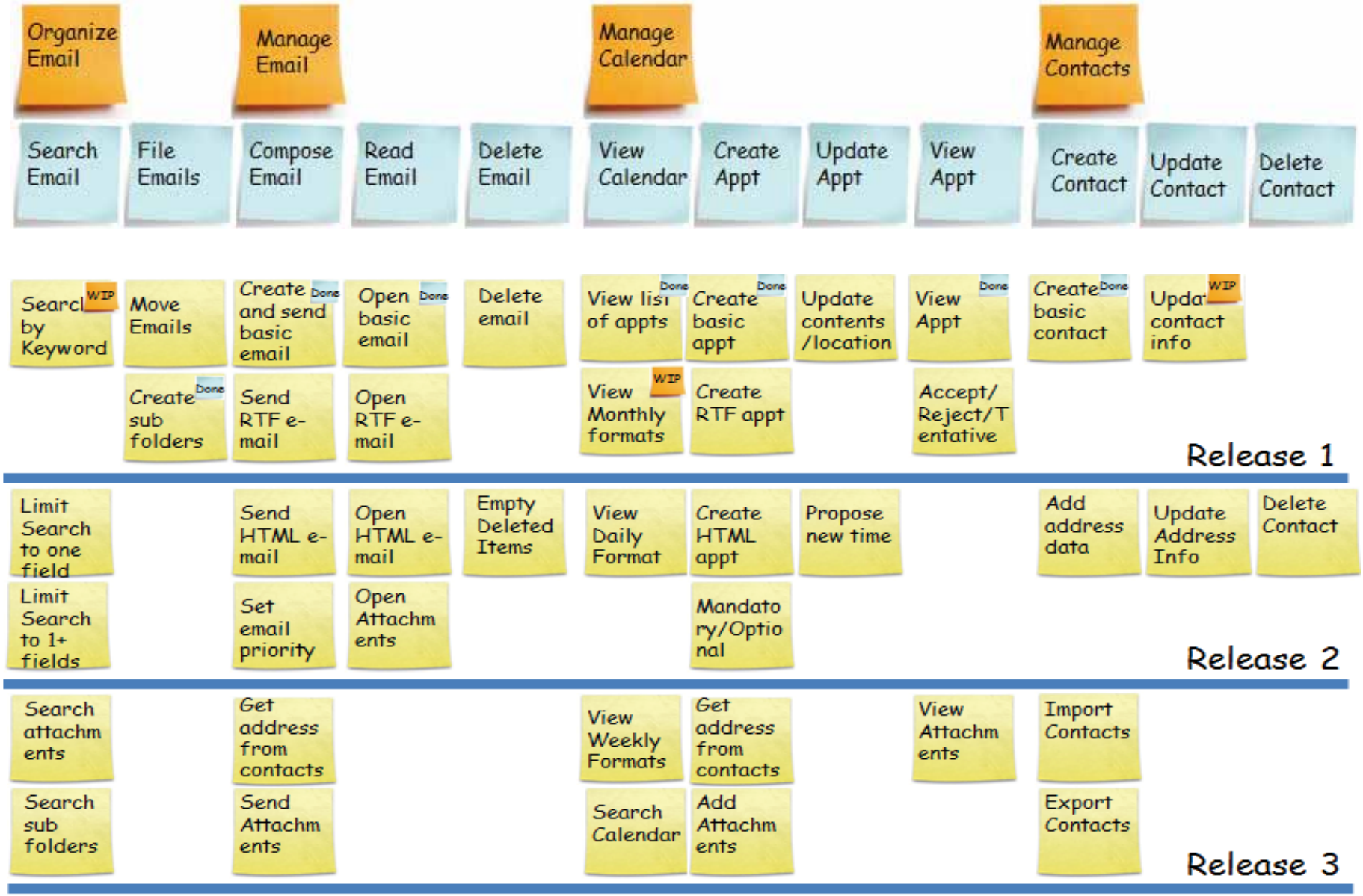


*Mike Cohn, User Stories Applied

Ron Jeffries http://xprogramming.com/articles/expcardconversationconfirmation/

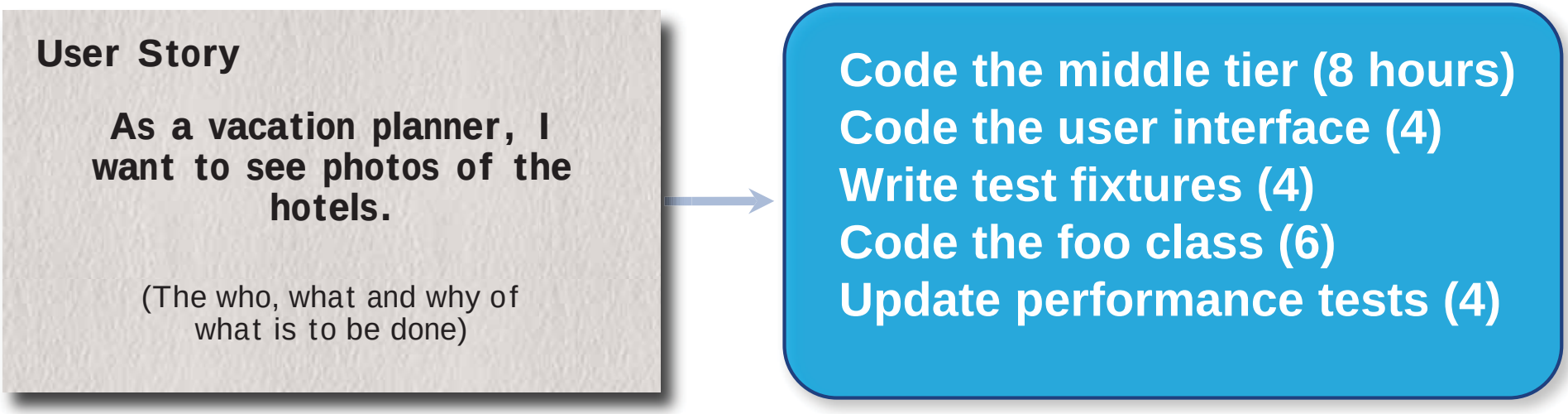
Requirements Collection / User Stories

- "Big Stories" to Small Stories



Sprint Planning

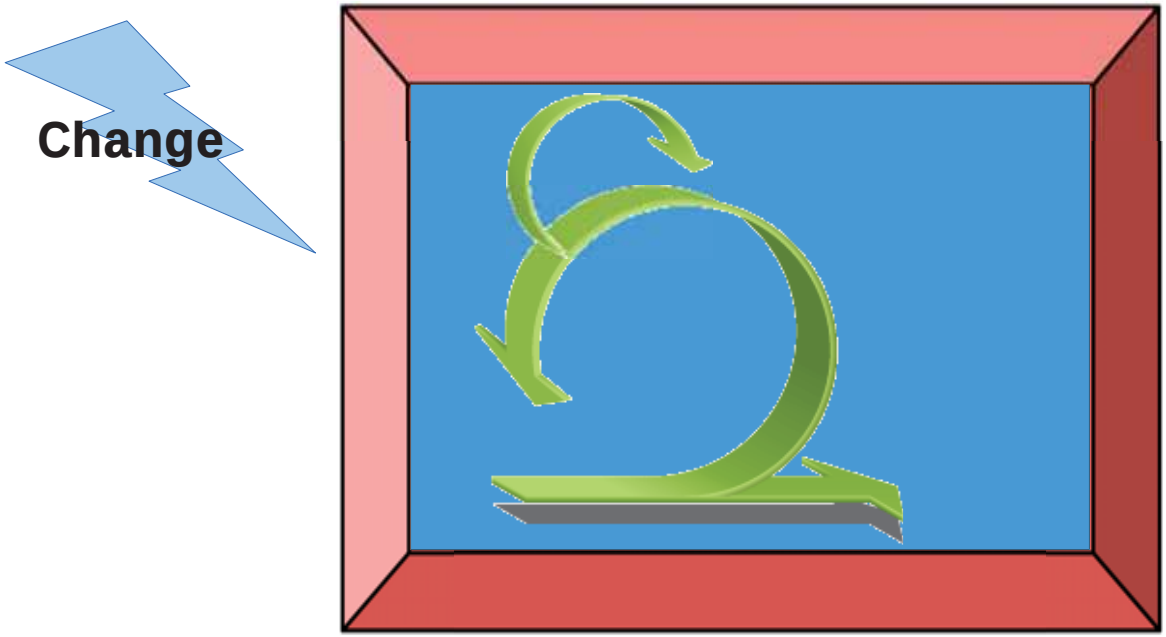
- Team selects User Stories from the product backlog they can commit to completing
- Sprint backlog is created
  - Tasks are identified and each is estimated (1-16 hours)
  - Done Collaboratively, not alone by the Scrum Master/Product Owner
- High-level design is considered



Sprints

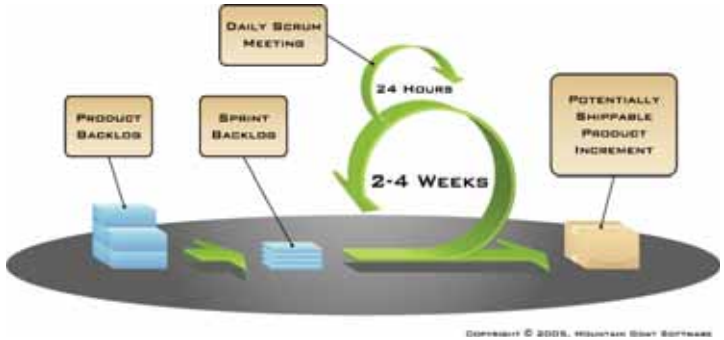
- Scrum projects make progress in a series of “sprints”
- Typical duration is 2–4 weeks or a calendar month at most
- A constant duration leads to a better rhythm
- Product is designed, coded, and tested during the sprint

No changes during a sprint



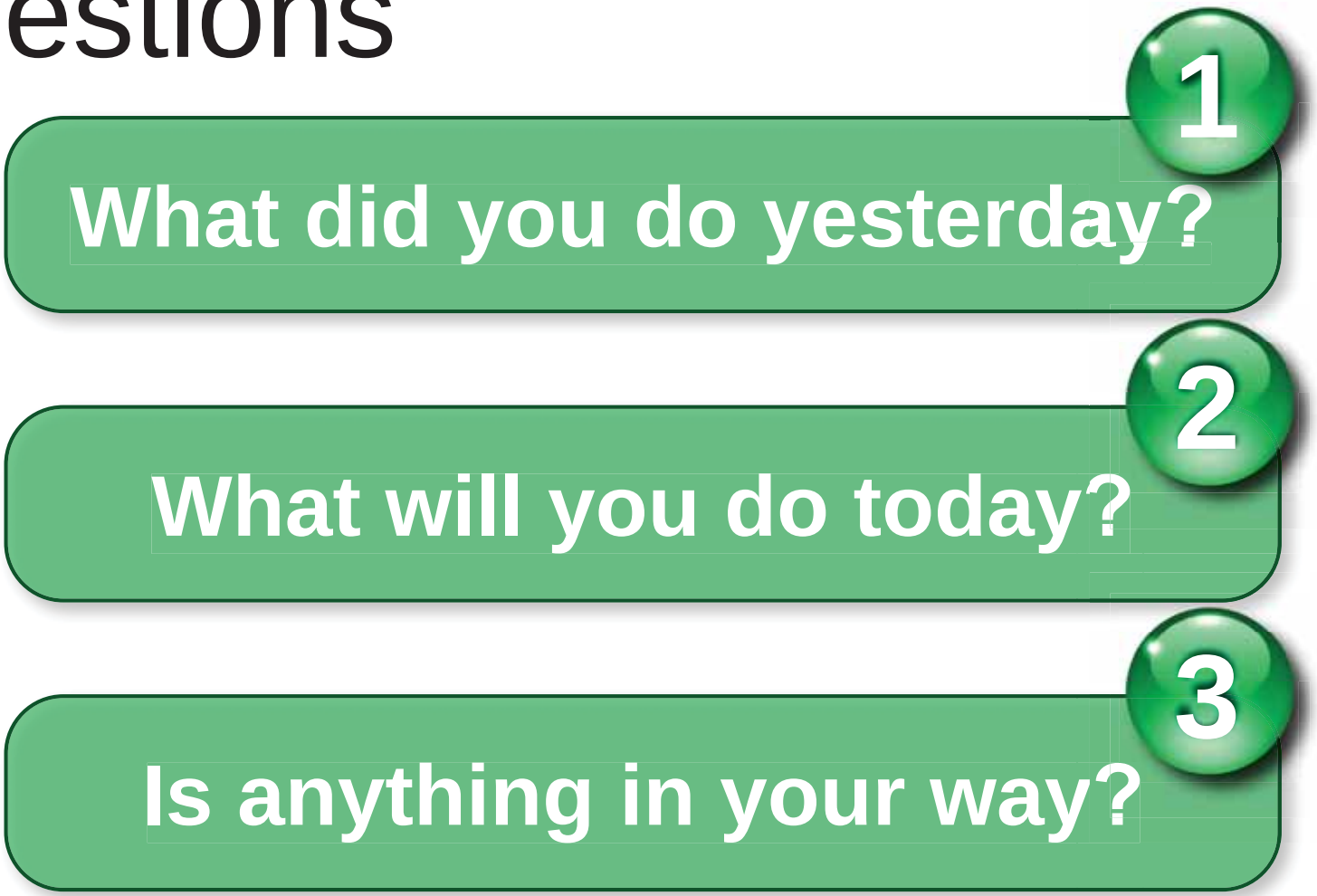
- Plan sprint durations around how long you can commit to keeping change out of the sprint

The Daily Scrum



- Parameters
  - Daily
  - 15-minutes
  - Stand-up
- Not for problem solving
  - Whole world is invited
  - Only team members, ScrumMaster, product owner, can talk
- Helps avoid other unnecessary meetings

Everyone Answers Three Questions



- These are *not* status for the ScrumMaster
- They are commitments in front of peers

The Sprint Review

- Invite the world
- Whole team participates
- Informal
  - 2-hour prep time rule
  - No slides
- Team presents what it accomplished during the sprint
- Typically takes the form of a demo of new features or underlying architecture

Sprint Retrospective

- Periodically take a look at what is and is not working
- Typically 15–30 minutes
- Done after every sprint
- Whole team participates
  - ScrumMaster
  - Product owner
  - Team
  - Possibly customers and others

Start / Stop / Continue

- Whole team gathers and discusses what they'd like to:

Start doing

Stop doing

Continue doing

This is just one of many ways to do a sprint retrospective.

Scrum Framework

Team Roles

- Product owner
- ScrumMaster
- Team

Events

- Sprint planning
- Sprint review
- Sprint retrospective
- Daily scrum meeting

Artifacts

- Product backlog
- Sprint backlog
- Burndown charts

Product Backlog

This is the product backlog

- The requirements
- A list of all desired work on the project
- Ideally expressed such that each item has value to the users or customers of the product
- Prioritized by the product owner
- Reprioritized at the start of each sprint

A Sample Product Backlog

Backlog item	Estimate
Allow a guest to make a reservation	3
As a guest, I want to cancel a reservation.	5
As a guest, I want to change the dates of a reservation.	3
As a hotel employee, I can run RevPAR reports (revenue-per-available-room)	8
Improve exception handling	8
...	30
...	50

Sprint Backlog

This is the sprint backlog

- One or more Product Backlog items make up the Sprint Backlog.
- The work is decomposed into tasks and hours.
- If work is unclear, define a sprint backlog item with a larger amount of time and break it down later.
- Individuals sign up for work - work is never assigned.
- Estimated work remaining is updated daily as more becomes known.
- Any team member can add, delete or change the sprint backlog.

A Sprint Backlog

Tasks	Mon	Tues	Wed	Thur	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	4	
Test the middle tier	8	16	16	11	8
Write online help	12				
Write the foo class	8	8	8	8	8
Add error logging			8	4	

Burndown Example

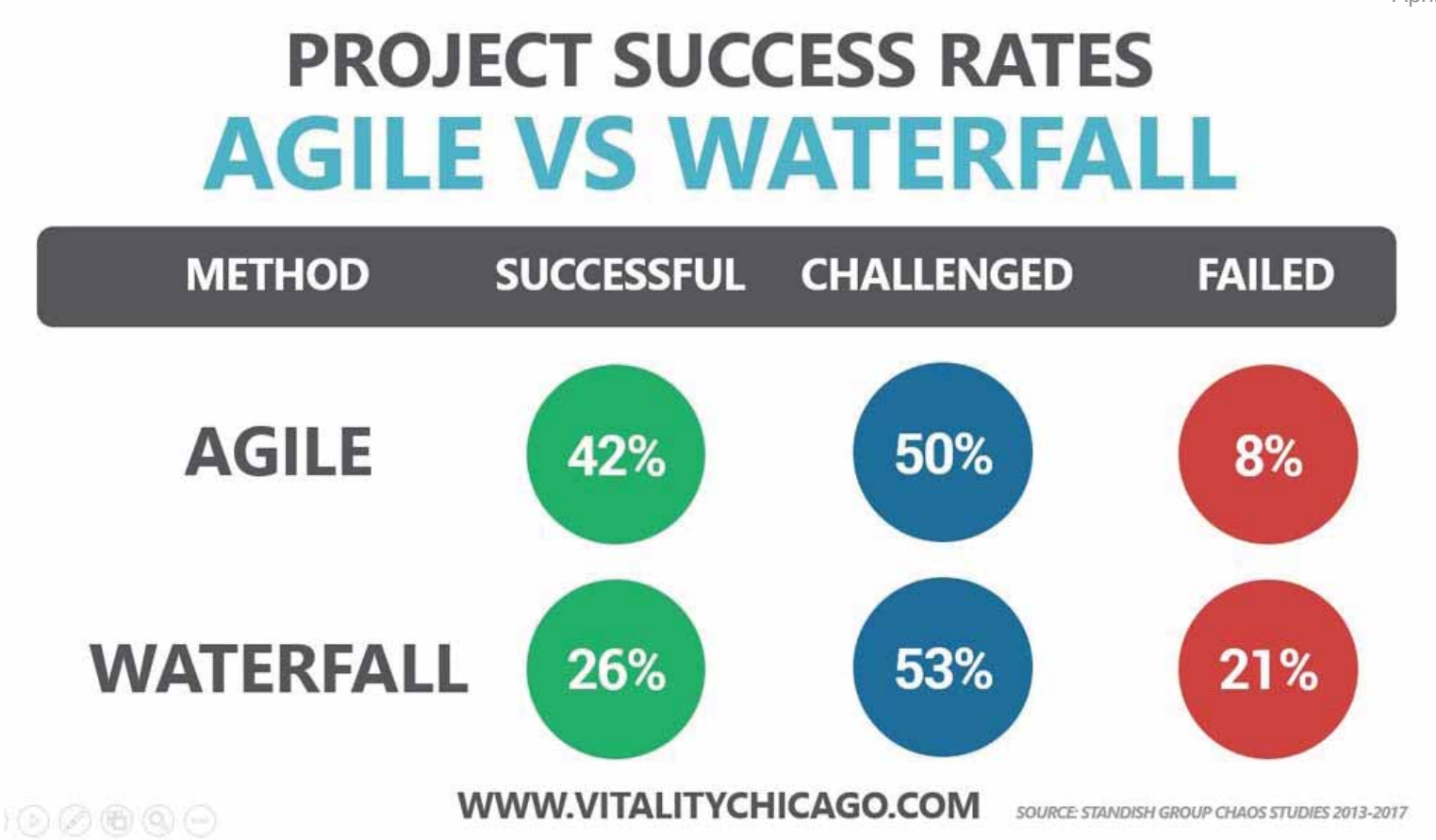
Tasks	Mon	Tues	Wed	Thur	Fri
Code the user interface	8	4	8		
Code the middle tier	16	12	10	7	
Test the middle tier	8	16	16	11	8
Write online help	12				
	44	32	34	18	8

Ideal

Why do this?

Reasons for Adopting Agile Success Rates

April 1, 2018



https://vitalitychicago.com/blog/agile-projects-are-more-successful-traditional-projects/

Bottom Line

- Agile projects are 2X more likely to succeed
- Agile projects are1/3 less likely to fail than waterfall projects

The Standish Group has conducted surveys of IT project success and failure rates every 2 years since 1994.

Source: Standish Group Chaos Study 2018

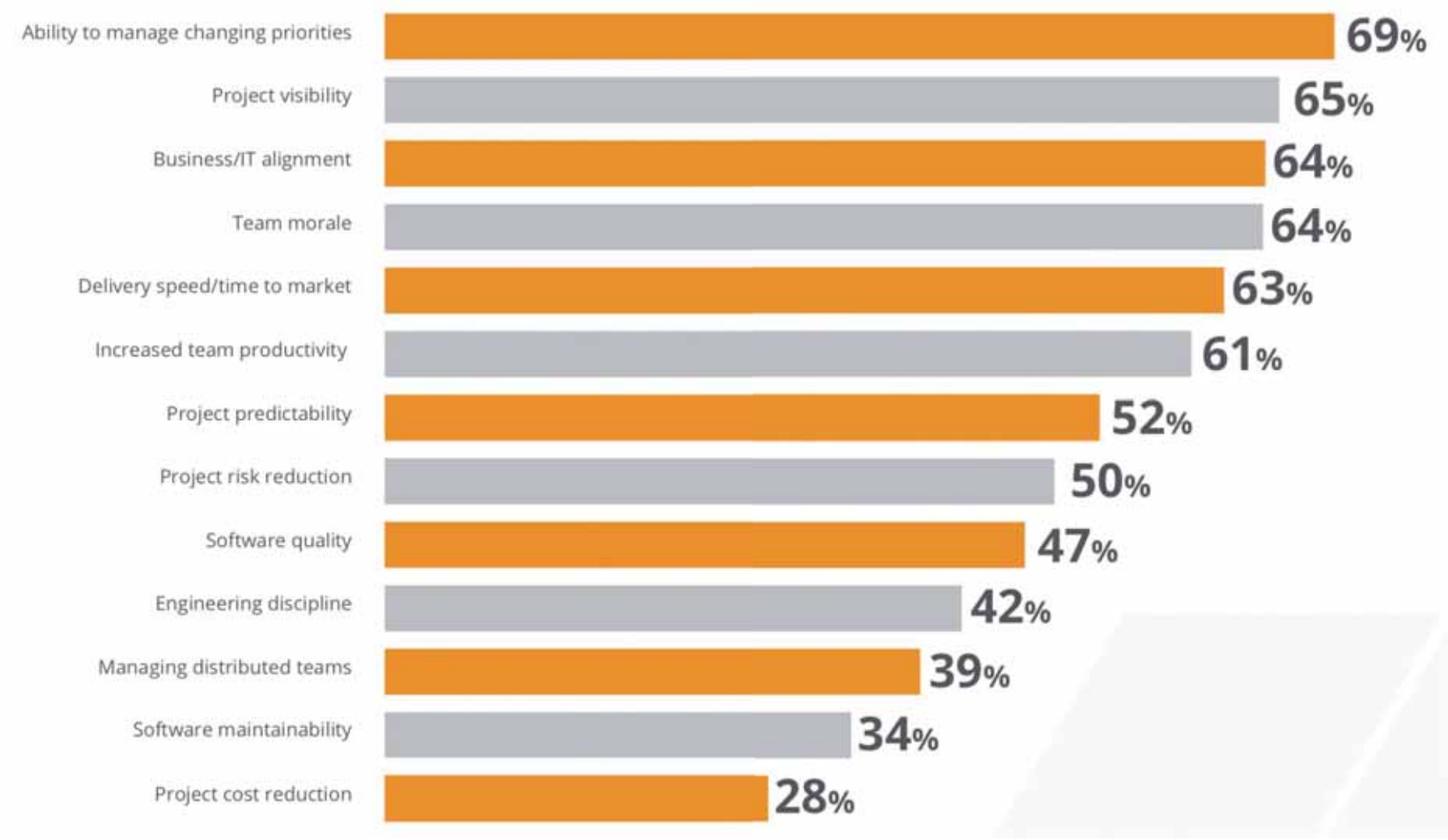
Reasons for Adopting Agile Shifts in Industry Attitudes

Changes from 2018 to 2019

- Less about increasing productivity (51% compared to 55%)
- More about improving team morale (34% compared to 28%)
- Less about reducing project risk (28% compared to 37%)
- More about reducing project costs (41% compared to 24%)

Source: 13th-annual-state-of-agile-report.pdf - 2019 - https://www.stateofagile.com/#ufh-c-473508-state-of-agile-report

Benefits of Adopting Agile



Source: 13th-annual-state-of-agile-report.pdf - 2019 - https://www.stateofagile.com/#ufh-c-473508-state-of-agile-report

Scrum has been used for:

- Commercial software
- In-house development
- Contract development
- Fixed-price projects
- Financial applications
- ISO 9001-certified applications
- Embedded systems
- 24x7 systems with
  99.999% uptime requirements
- The Joint Strike Fighter
- HR improvement projects
- Sales and Marketing projects
- Training and Education
- Video game development
- FDA-approved, life-critical systems
- Satellite-control software
- Websites
- Mobile phones
- Network switching applications
- ISV applications
- Some of the largest applications in use

Agile Principles in Action

The Troubled HH60W Program

“The team had a moment whether we decided we’re all in, and we’re going to to do whatever it takes,” Roper tells Aviation Week. “We’re going to follow the rules, but we’re going to slim them down to the minimum set necessary to keep us focused on delivering on time.”

Will Roper, Air Force acquisition executive

The “old school” methods shaved 4 months from the deployment test program.

Aviation Week & Space Technology/October 28-November 10, 2019

Jeff Pulcini

Jeff.Pulcini@me.com

248-462-9794

Scrum Has Been Used By

- Microsoft
- Yahoo
- Google
- Electronic Arts
- High Moon Studios
- Lockheed Martin
- Philips
- Siemens
- Capital One
- BBC
- Intuit
- Nielsen Media
- First American Real Estate
- BMC Software
- Ipswitch
- John Deere
- Nokia
- Lexis Nexis
- Sabre
- Salesforce.com
- Time Warner
- Turner Broadcasting
- Oce

6

Stories emphasize the user's goals not the system's attributes.

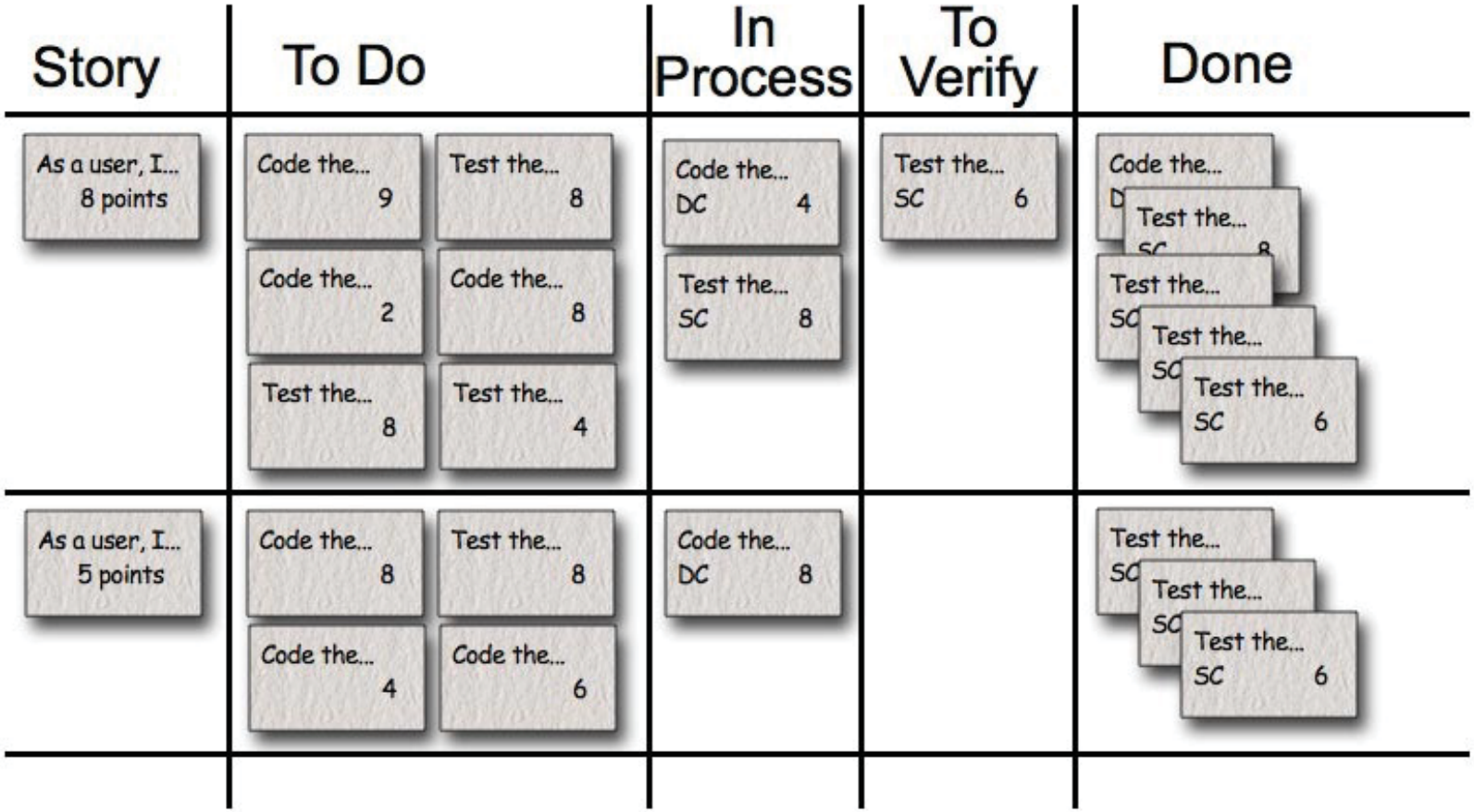
What are we building?

1. The product shall have a gas engine.
2. The product shall have four wheels.
   2.1. The product shall have a rubber tire mounted to each wheel.
3. The product shall have a steering wheel.
4. The product shall have a steel body.

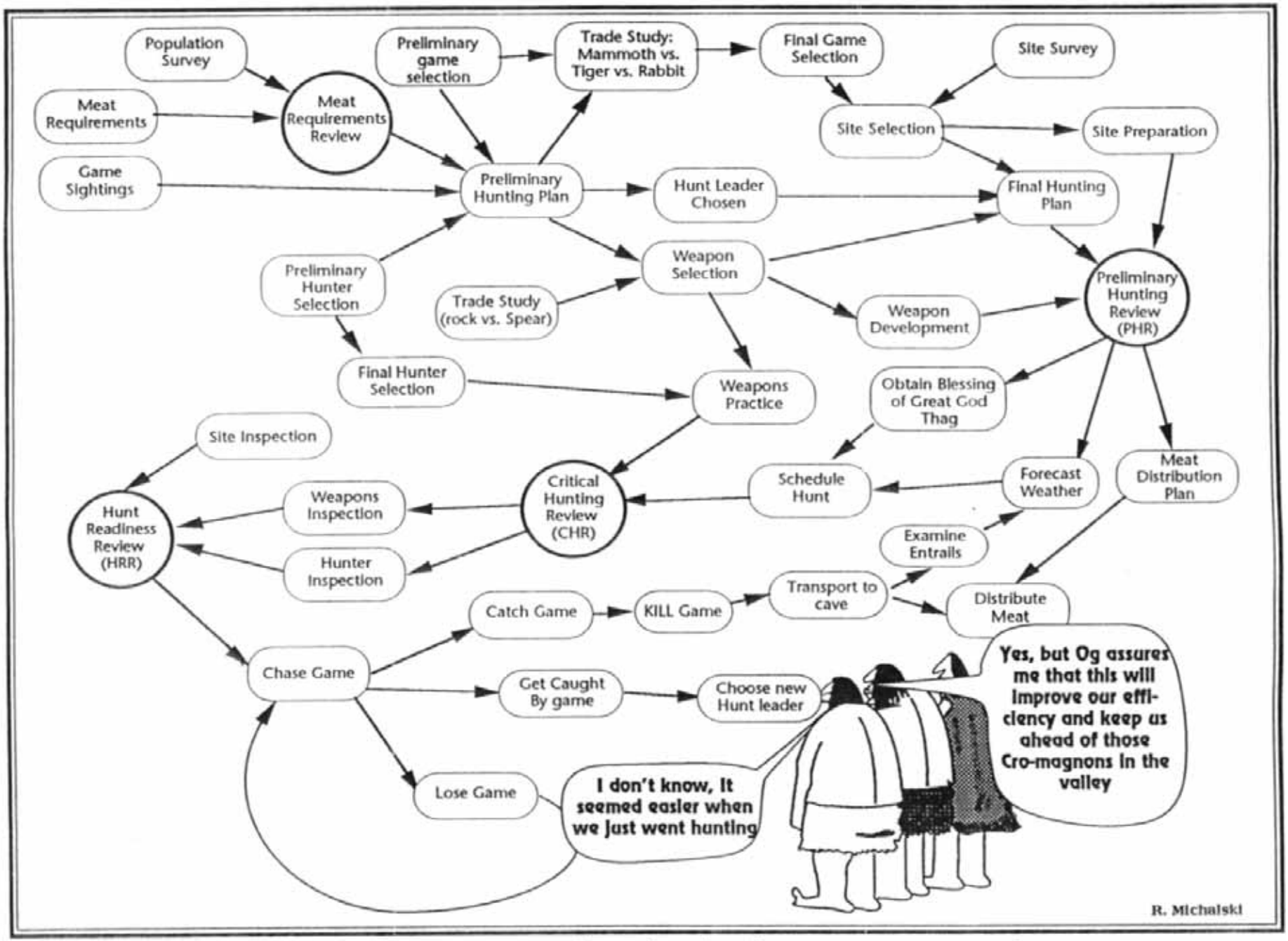
Source: Adapted from *The Inmates are Running the Asylum* by Alan Cooper (1999).


M1A2 SEP

Example Task Board



Reproduced from http://www.mountaingoatsoftware.com/agile/scrum/task-boards



• Why the Neanderthals became extinct •