

The Agile Journey

To Deliver the Industrial Internet ...



Alan
Schachtely



GE Software



Software Solutions Group

The SSG

An agile transformation ...

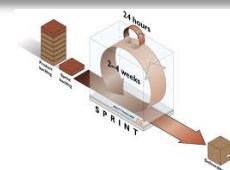


5 P&L's & 100 products
GE Energy...M&D & T&D, Energy MGMT., Smart Grid!

13 Locations



70 scrum teams



800 Engineers



\$450M Revenue

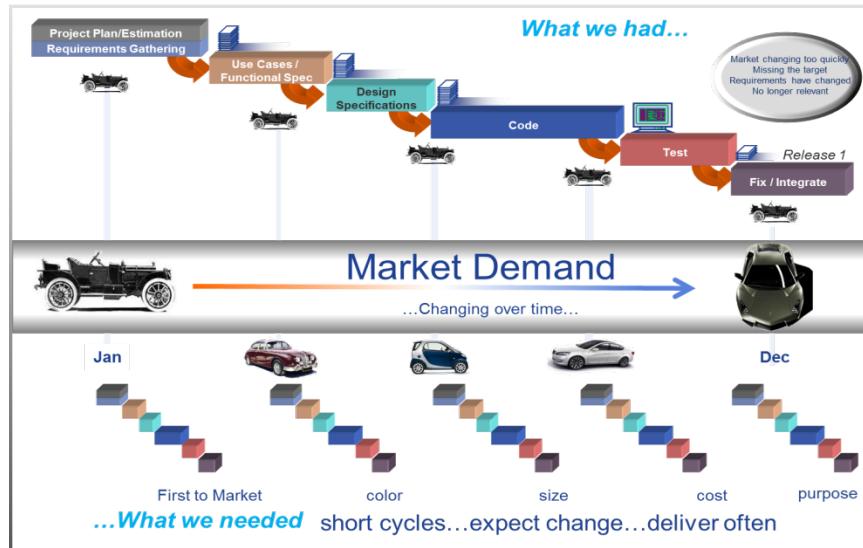
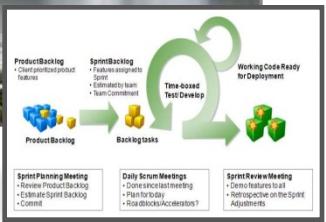


Agile Adoption: We wrote our book!



Process

- Iterative development
 - 2 weeks
- short cycles
 - 3-6 months
- focus on customer business within the team



SSG Organization



Reorganization

- Agile leadership
- 800 agile personnel
- 70 scrum teams
- 13 locations



Agile – things need to change...

New Environments

- Dedicated scrum rooms
- break out areas
- new data center
- lab environments



New Technology

- Monitors
- Smart Boards
- Video interfaces
- faster build machines
- improved dev machines
- CI/CD - Infrastructure



Removing impediments ...

Impediments...

Less wait time



10-15 hours per build
1 build per month
Manual starts
Multiple issues when broken

Productivity



Manual testing – 5 weeks
Human error
Limited testing windows

Code Quality



Limited code quality analysis
Inconsistent measurement systems
No central reporting

Innovation...

Electric Accelerator



Build times to 10 minutes
Building up to 5 times per day
Automated on check-in
Broken builds known in minutes

Automated Testing

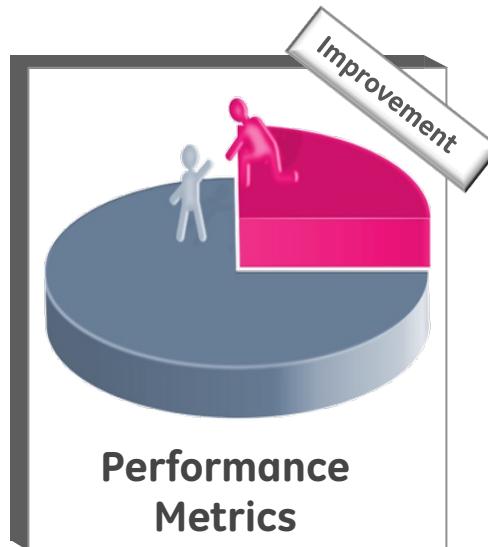


Parasoft



Site and central reporting
...all data in 1 location
Code coverage, code quality
...daily monitoring
Dead code actionable information

SSG - Success with agile concepts



Agile ... a context for change

NPI Tollgate Backlog:	0
NPI performance:	+ 50pts
VTW:	- 70%
Tollgates delivered:	+115%
Touch Time Reduction:	+3,225% V
CRD's:	-44%
Defect Backlog:	-92%

Great? This was just the beginning ...

GE Software

The journey continues ...



GE
Software
Framework



GE Software

GE Software Framework

Objective

Consistent SW development practices with
unified SW talent management ...
... enable delivery of the Industrial Internet

“The fact is there is a right way to do software, just like there is a right way to do material science. We execute material science the same way across GE; in fact no one would think about breaking best practices. We execute software in a thousand different ways and have outsourced some important capability. In order to be creative and fast, we must have a consistent software foundation”

-JRI

GE Software Framework

Driving Software Innovation in GE



Governance

Working teams dedicated to the evolution of the DevWorks practices, lead by an Executive Council

Assessment

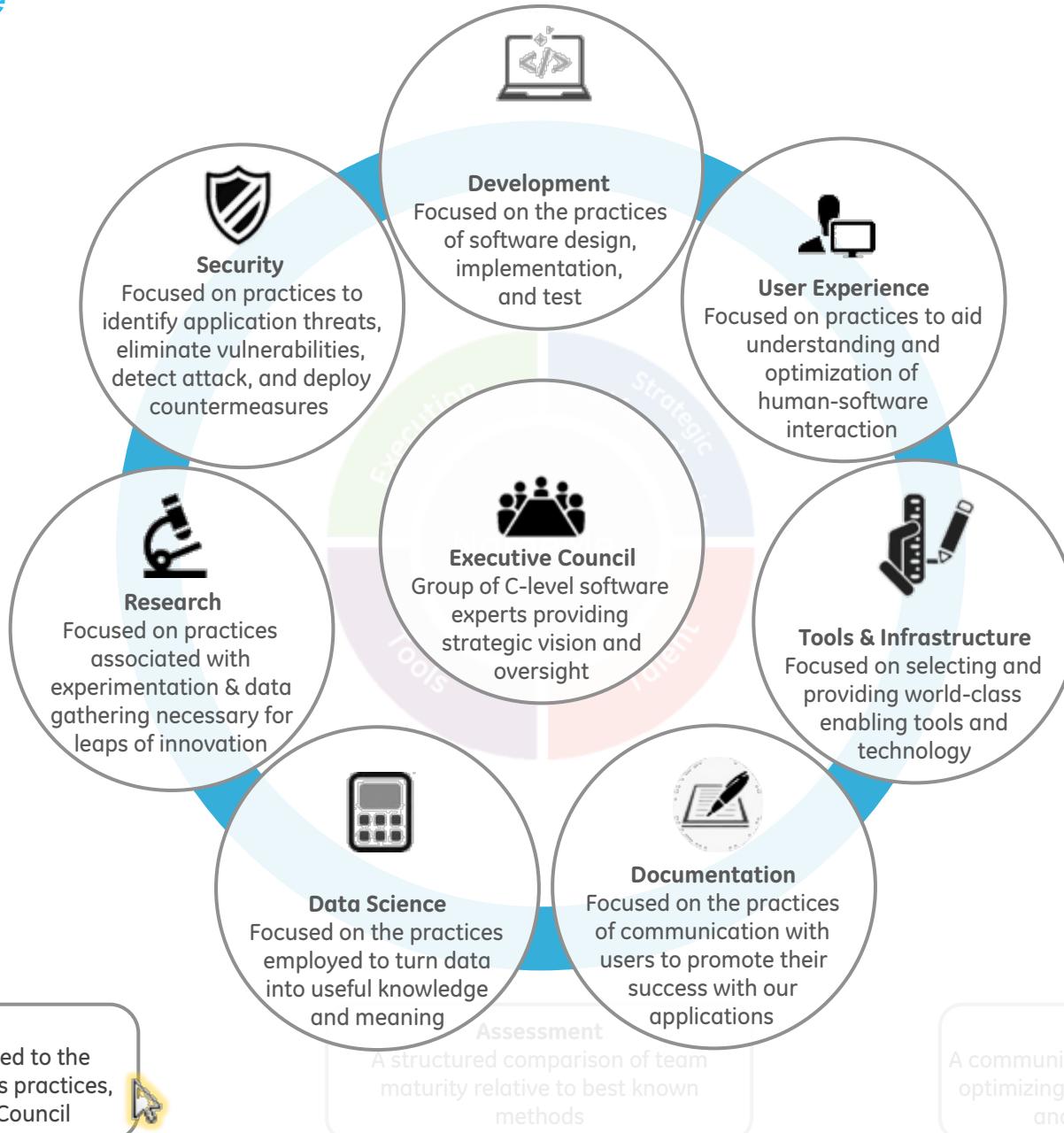
A structured comparison of team maturity relative to best known methods

Community

A community of practice facilitating and optimizing change, lead by nominated and trained Evangelists

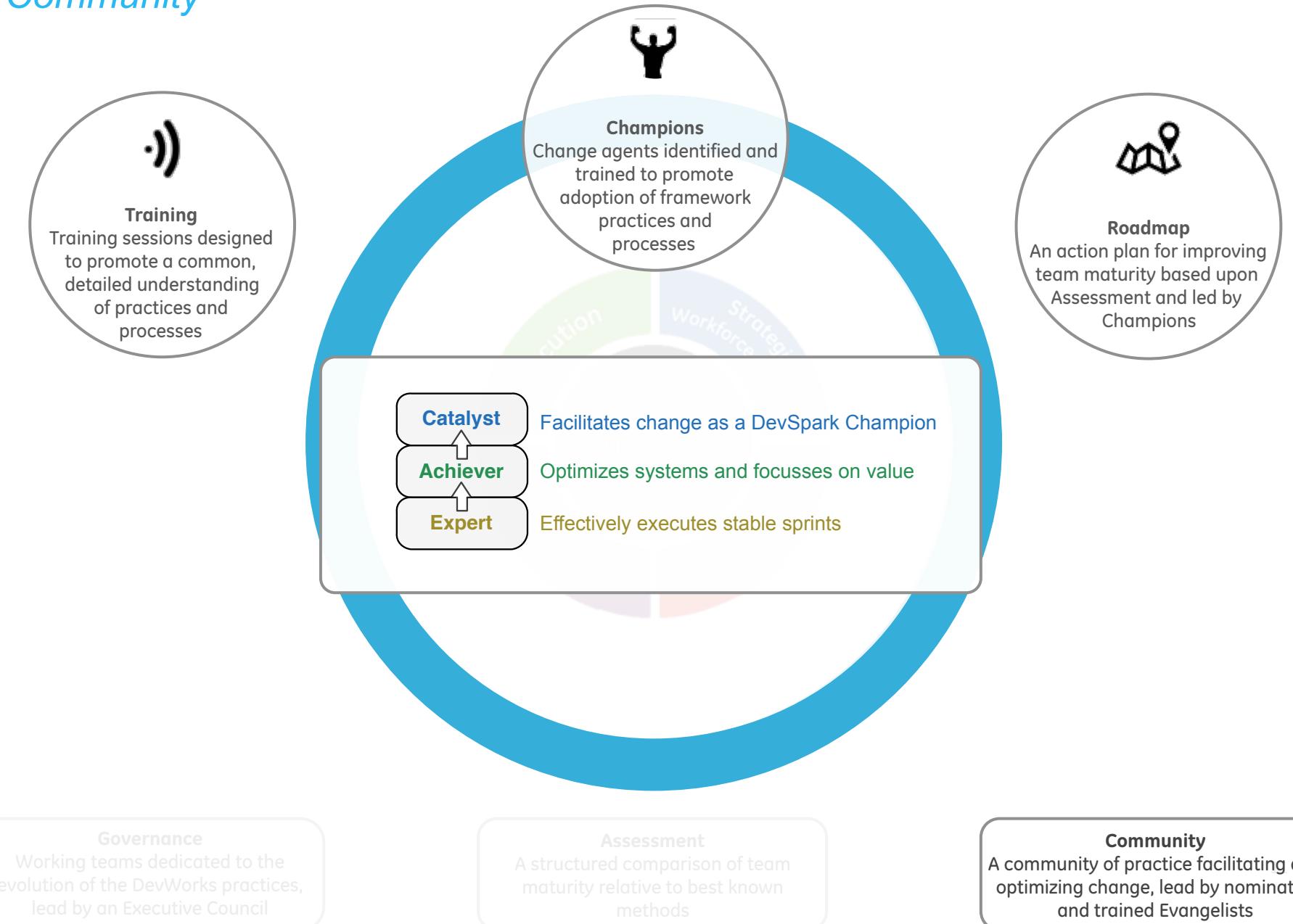
GE Software Framework

Governance



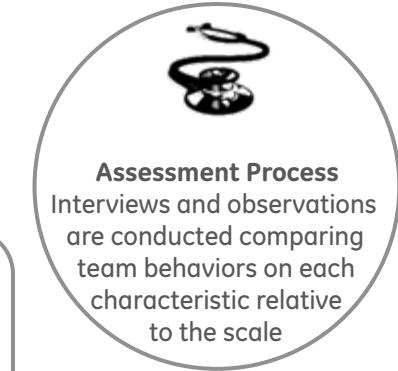
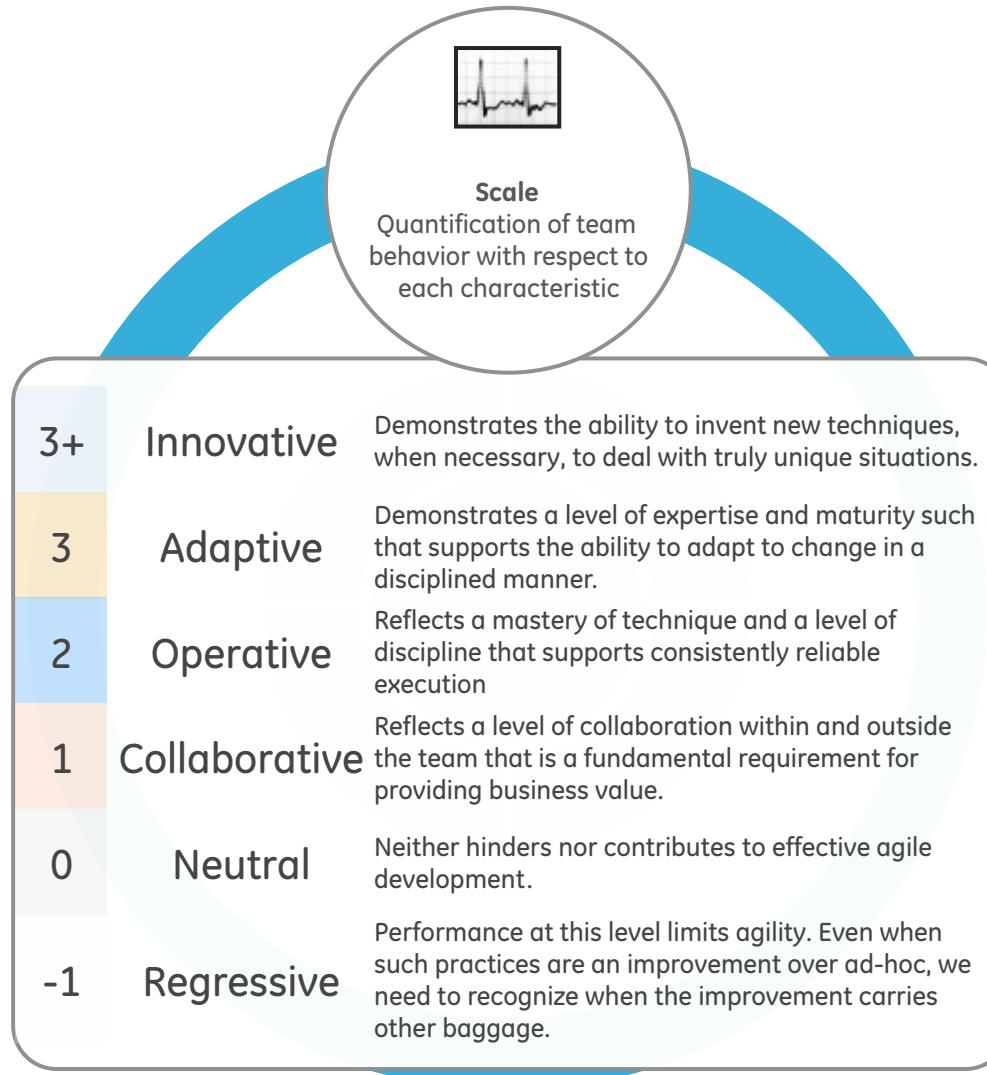
GE Software Framework

Community



GE Software Framework

Assessment



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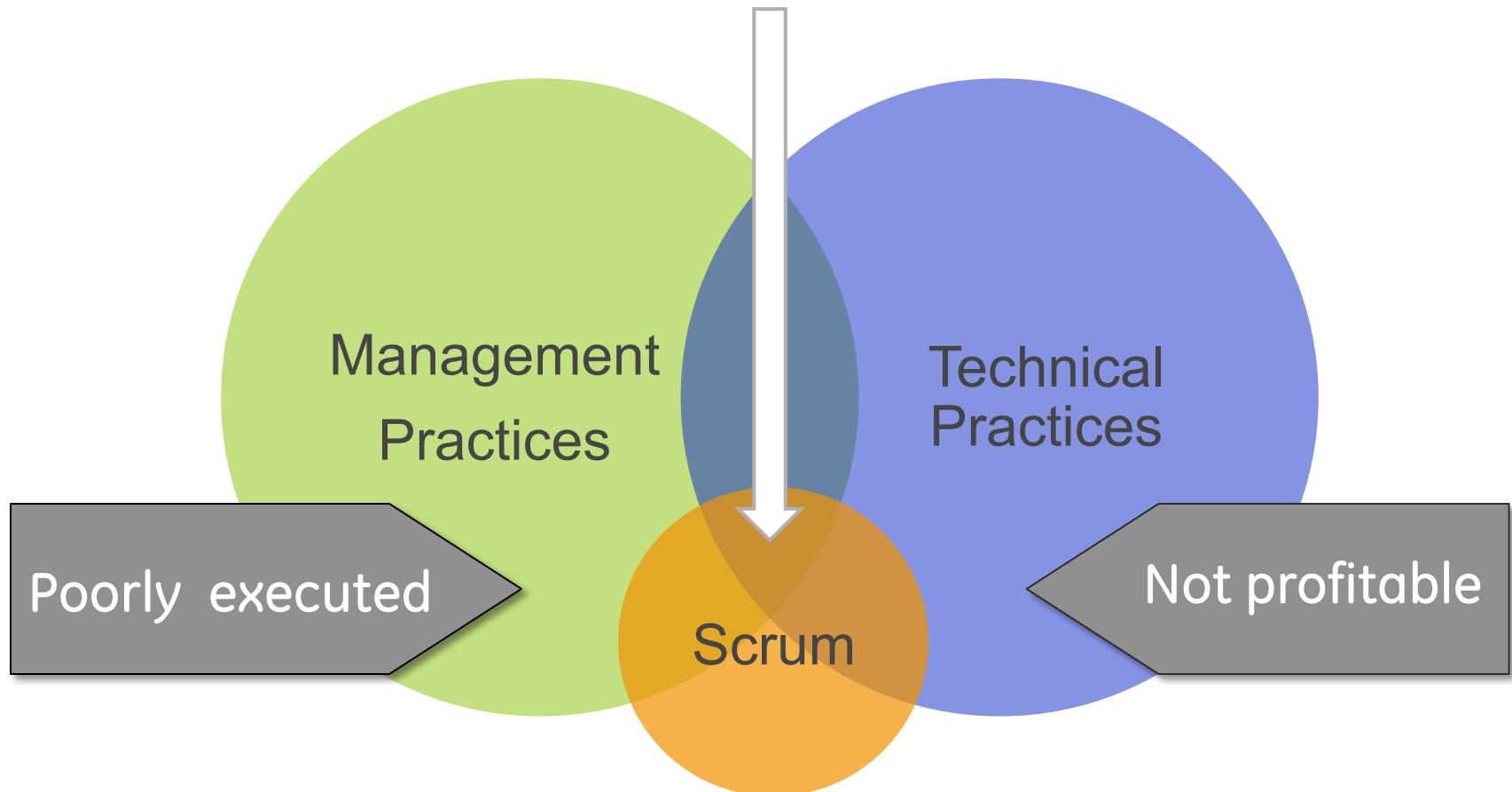
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GE Software Framework

Development Practices

Right thing - Right way



Management Practices

Techniques to organize people and collaborate



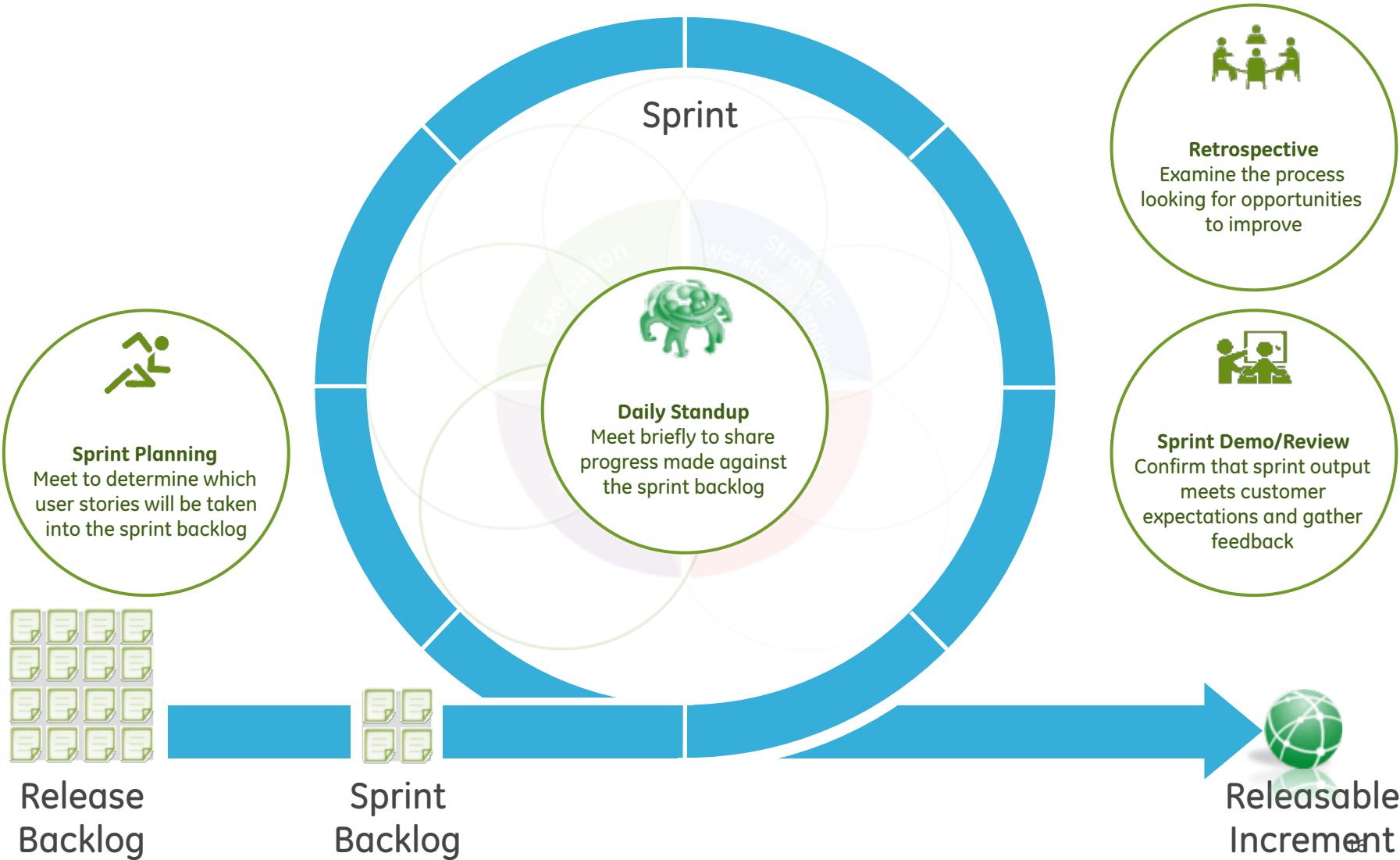
Technical Practices

Techniques employed by teams to promote quality & value



Scrum

An iterative approach to solicit & react to feedback



Industrial Internet

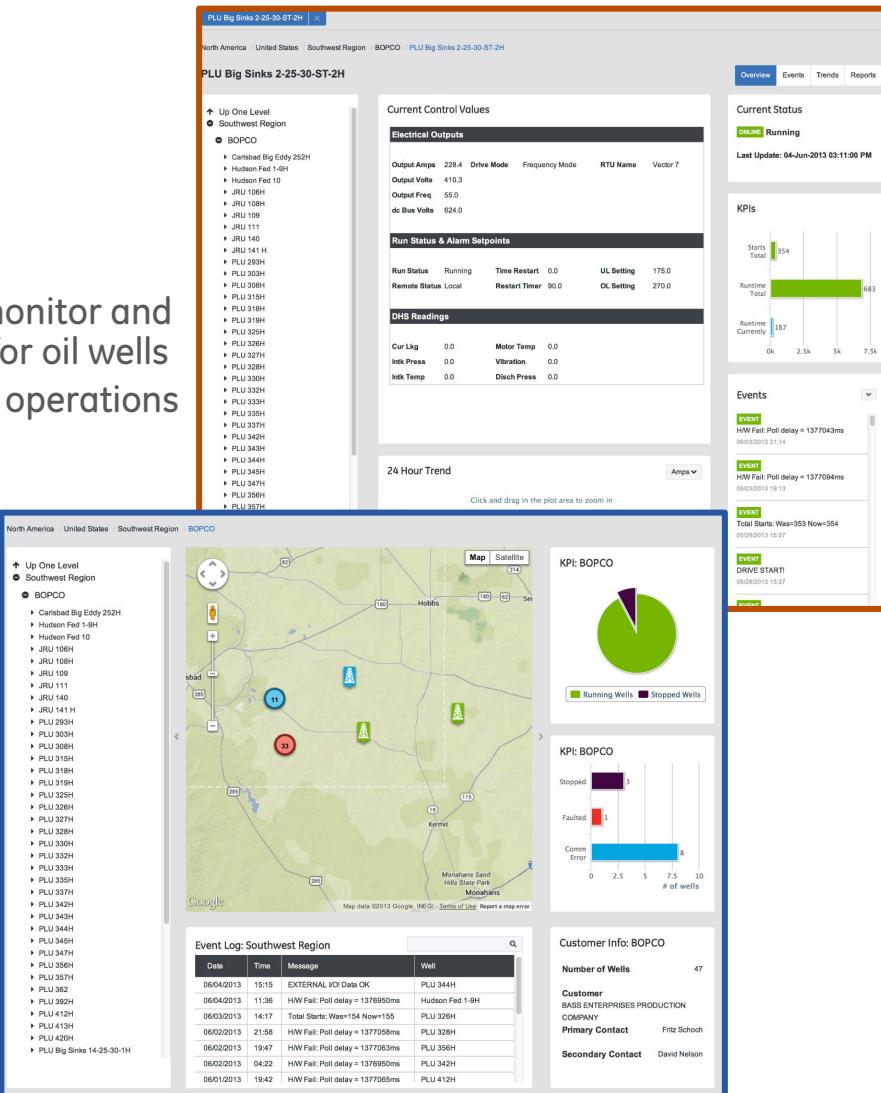
A new way forward ...

Product – Oil and Gas Industry

- Develop a remote monitoring and diagnostics system to monitor and control electric submersible pumps and surface pumping for oil wells
- Allow operators to perform remote control for certain well operations

Customer Value Based Solution

- Effort: 3 months, 7 people
- Engage customer directly – their issue is industry wide
- 30-day prototype that works in the field
- 3-month product – daily input from customer ...
- Engage the customer “using” the product during dev.
 - Monitoring 70+ wells during development
 - Real customer value in 30 days ...



Development Infrastructure ... key to credible success ...

Lessons Learned



Apply what we have learned
SSG Journey as a Industrial Internet springboard

Establish the Reference Standard
San Ramon as an Incubator

Build the SW Community of Practice
Shared Experience across GE ... Shared Journey

SW Infrastructure matters ...
Developer Cloud / Industrial Cloud

SW assessments and surveys:
Use teams to help teams

GE Software Framework
Software as a first principle for 15K across GE

What I would like to know:
Software Experience of others in the Industrial Sector

Thank you...

