Agile-Enabled High Maturity
SEPG NORTH AMERICA 2013

Richard Swensen | Process Improvement Director
Sean Cohan | Technical Director
Serving Our Customers and the Nation
Pragmatics Core Capabilities

Software Engineering
- Agile development (Pragmatic Agility®)
- Mobile applications
- Command and control systems
- Configuration management
- Web-enabled applications
- Agile Business Intelligence
- Business Analytics

Cybersecurity
- ISO/IEC 27001 certified
- Security engineering; secure network design and integration
- Risk and threat analysis (Cyber Operations Improvement ModelSM, Cyber-SmartSM)
- Certification and accreditation
- PrecisionSM penetration testing
- Auditing and FISMA compliance

IT Service Management
- ISO/IEC 20000-1 certified (ITIL®) operational model
- Help/service desk
- Database administration
- Network operations
- Desktop management

AV & Learning Technologies
- Electronic classrooms
- Simulation and gaming rooms
- Auditoriums and conference rooms
- Video teleconferencing (VTC) and web meeting software solutions
- Help desk and support programs

Systems Engineering
- Requirements management
- Analysis of alternatives
- CONOPS and performance measures
- GPS-enabled air traffic and safety
- IV&V (Pro-3e®)

Program Management
- Project management
- Acquisition support
- Earned value management
- Enterprise architecture
- Information management
## What is Pragmatic Agility®?

### SCRUM

**Management Framework**
- Product Backlog
- Sprint Planning
- Daily Scrum
- Burn-down Chart
- Sprint Review
- Sprint Retrospective

**Benefit**
- Visibility
- Predictability
- Adaptability
- Value

### Extreme Programming (XP)

**Development Methodology**
- Continuous Testing
- Pair Programming
- Co-Location
- Code Refactoring
- Continuous Integration
- Collective Ownership

**Benefit**
- Quality
- Adaptability
- Efficiency

### CMMI

**Continuous Process Improvement**
- Defined Processes
- Defined Metrics
- Process Measurement
- Process Improvement

**Benefit**
- Quality
- Predictability

---

Based on Best Practices and Lessons Learned providing Agile within Government SDLCs
Delivering custom software to the Federal Government using Agile Methods since 2004
Pragmatics, Inc.

User Experience

• Pragmatics relies on agile development methods to achieve and sustain its CMMI-DEV® Level 5 capabilities

  – Understanding process performance supports business objectives
  – Agile sprints of 2-4 weeks provide regular data cycles for measures of Test Driven Development (TDD) and Continuous Integration
  – Project CCB reviews testing metrics for product increments maintaining quality from sprint to sprint, and supporting project objectives
Pragmatics Business Objectives

• Quality Manual
  – Customer Satisfaction
  – Staff Satisfaction
  – Revenue
  – Profit

Quality Manual focuses on quality objectives that support our four business objectives.
Pragmatic Agility® In Action

- Flexibility of iterative agile development methodology
- Repeatability and metric-driven continuous improvement of CMMI® Level 5

Projects embrace changing requirements, yet stay on schedule and budget, minimize risk, and maximize product quality
Agile Process Architecture – High Level

Practices and guidelines for delivering customer value while adapting to changing requirements
Agile Process Architecture – AD-03 Implementation

Analyzing, refining, and elaborating user stories by breaking stories down into workable tasks
Agile Process Architecture – AD-03.02 Test Driven Development

Transforming the stories/tasks design into executable code using test-driven development
Agile Process Architecture – AD-04.03 Testing

Pragmatics, Inc.

Testing and delivery to make system available to end users
Agile Process Measurement

Continuous measurement sprint by sprint and release by release
Pragmatic Agility Process Performance

Test Code Coverage-related defects per KLOC by Sprint

Project data from June 2011 through June 2013.
Process Model Performance – Pragmatic Agility

Baseline Chart of Predicted vs. Actual differences

Actual variance normal. Modeled variance accurate.
High Maturity Framework

Process X-01 Performance

Predicts

Project Result

Business Objective

AD-04.03 Testing Defects/KLOC

Defect Density = f(TCC %)

Software Quality (escaped defects/KLOC)

Quality of Deliverables (key factor -> customer satisfaction)

Customer Satisfaction (customer satisfaction survey results)

Revenue

Profit

Staff Satisfaction

AD-05.01/PS-04 Peer Review Defects/Page

Defect Density = f(review hours)

Document Quality (escaped defects/page)
Lesson Learned #1

• Data integrity – When you form a hypothesis and run a correlation matrix and you expect an obvious correlation between predictors and outcomes but you find none, look at the data and in particular the data collection methods.

• In our case a root cause analysis found that the testers were incorrectly assigning problem types – marking defects as display errors when in fact they were logic and I/O errors and should have been included in the matrix data but were not.

• We held a training session with the testers to correct the problem and then did a data scrub to correctly assign problem types and then a correlation was found as expected.
Lesson Learned #2

• Getting lost in the numbers – It is easy to get lost in a statistical tool and start running correlation matrices on things that don’t make practical sense.

• You might find some correlations that are very strong but not particularly useful so be sure to start with a hypothesis first so you don’t go down any rabbit holes.
Conclusion

• Understand process performance to support the business
  – Agile process framework
  – Defined processes
  – Measurement program
  – Balance development and test resources

• Agile sprints provide regular data cycles
  – Measureable processes in every sprint
  – Supports data integrity

• Mentors and High Maturity Lead Appraisers (HMLAs)
  – Must have experience with Agile and Lean Six Sigma
  – Must understand how to apply CMMI-DEV® to operations

Pragmatics agile development enables CMMI® Level 5
References

Publications referenced for this presentation:


• An Agile Development Team’s Quest for CMMI® Maturity Level 5, presentation by Sean Cohan, Agile Alliance, Agile2010 Conference


Appraisals referenced for this presentation:

• Class B: Global Process Solutions LLC, Peter Barletto High Maturity Lead Appraiser (2011)

• CMMI® V1.3 DEV Maturity Level 5: Global Process Solutions LLC, Peter Barletto High Maturity Lead Appraiser (2012)
Contact Information

Richard Swensen is the Director of Process Improvement at Pragmatics and manages its Quality program

Sean Cohan is the Technical Director at Pragmatics and is the Pragmatic Agility® practice lead

swensenr@pragmatics.com  cohans@pragmatics.com