



Enjoying the Scenery on the Road to High Maturity

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Agenda

- Background
- Goals
- Changes in Emphasis
- Software Engineering Process
 - Things we did well
 - PPQA Activities
- High Maturity Processes & Six Sigma
- DMAIC
- Variation in the data
- Ah Ha moments along the way
- Questions



Who are we?

- Small IT organization in a Federal agency
- Began applying Lean in 2005 and Six Sigma in 2007
- CMMI Assessments:
 - CMMI (Dev) ML 2 & CL 3 in 9 PAs– May 2007
 - CMMI (Dev) ML 3 – May 2008



Goals

- Working toward CMMI Levels 4 and 5
- Utilizing Lean Six Sigma Tools
- Incorporating Lean and Agile, ITIL Services Model



A Change in Emphasis

From:

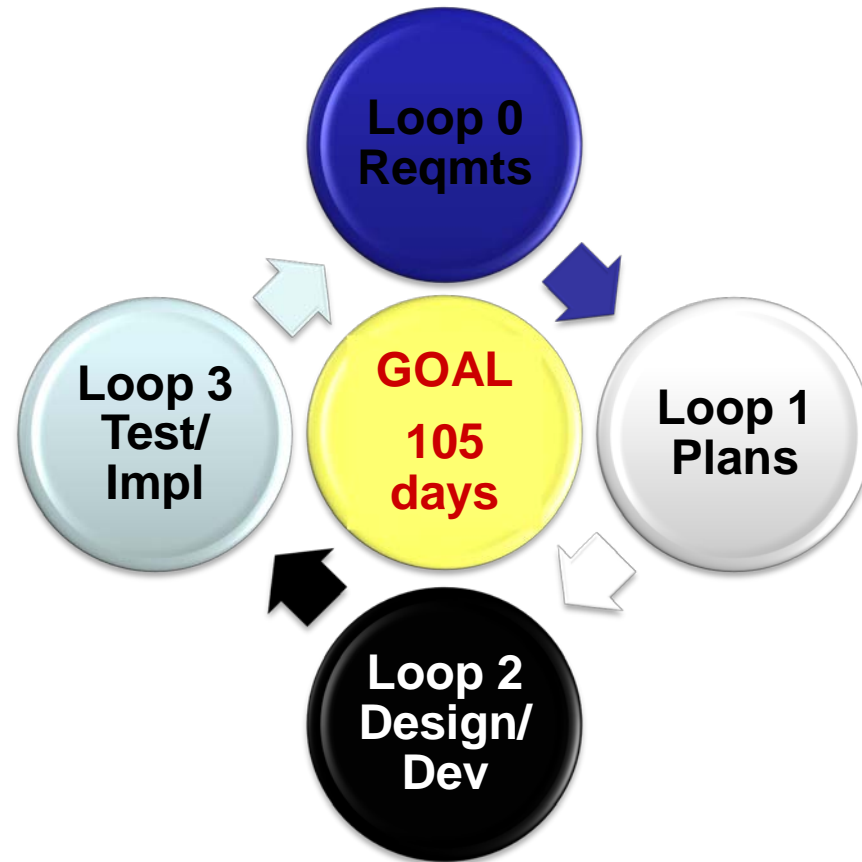
- Employees are the problem
- Doing my job
- Understanding my job
- Measuring individuals
- Change the person
- Correct errors
- Who made the error?

To:

- The Process is the problem
- Helping to get things done
- Knowing how my job fits in the process
- Measuring performance
- Change the process
- Reduce variation
- What allowed the error to occur?



Software Engineering Process (SEP)





Things we did well

- Clearly defined business goals
- Tied metrics to those goals
- Established standard processes
- Business Goal Example: Productivity
 - Measure lead time
 - Goal to deliver small iterations in 105 days
- Implemented Software Process Improvement Program (SPIP)
 - Empowered workforce to recommend changes to process and tools



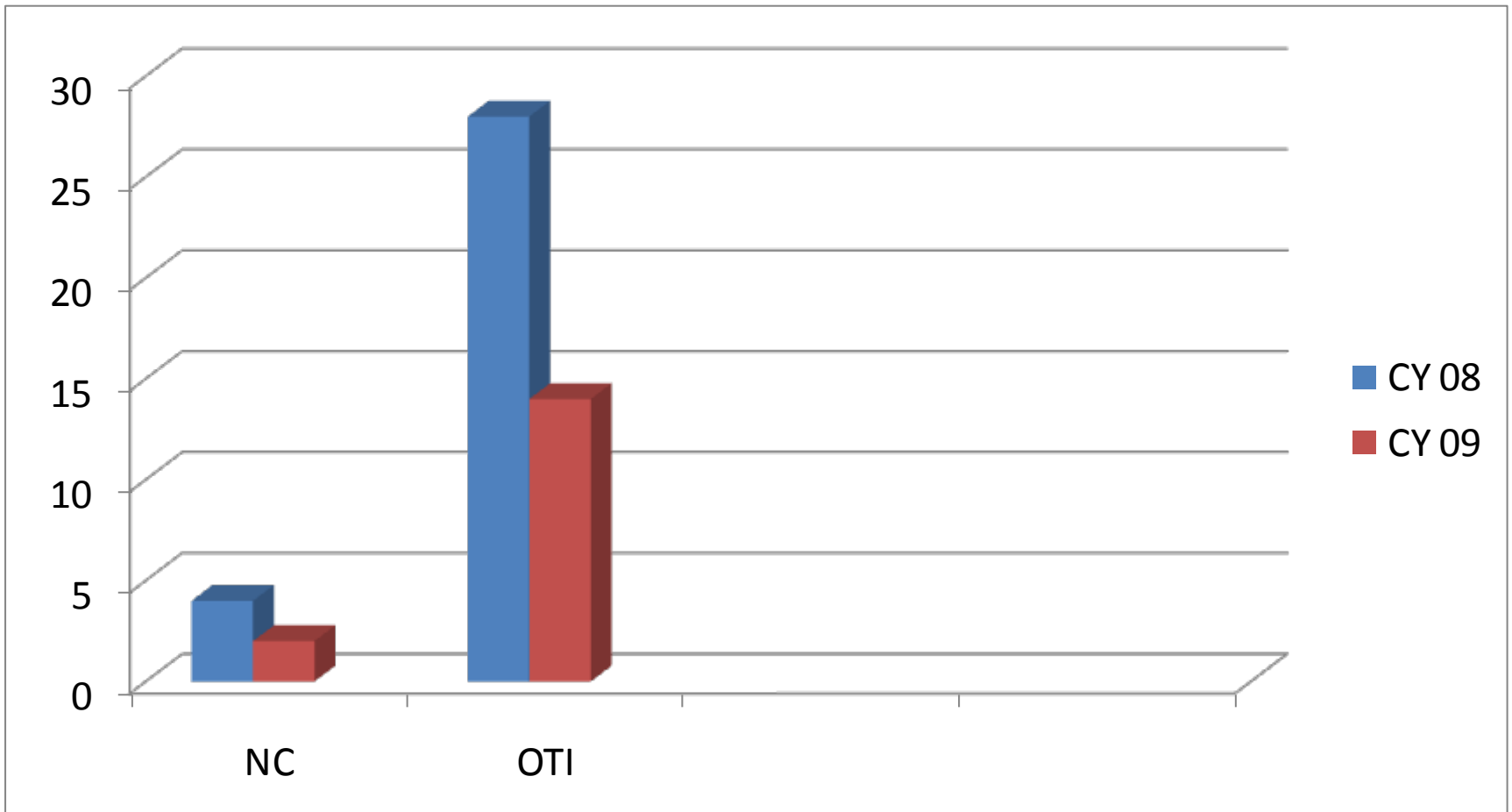
PPQA Activities

- Quality Assurance/Tester part of the Product Team
- Real time audits and the end of each Loop
- Quality Assurance Closeout Review (QACR) documenting non-compliances and opportunities to improve



Fewer Process Compliance Defects...

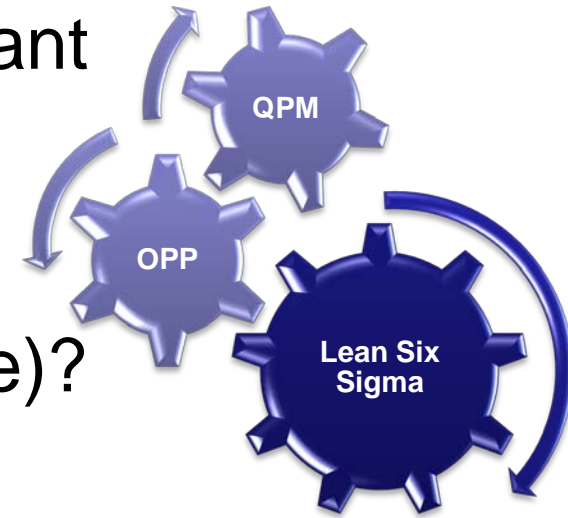
This is good, right?





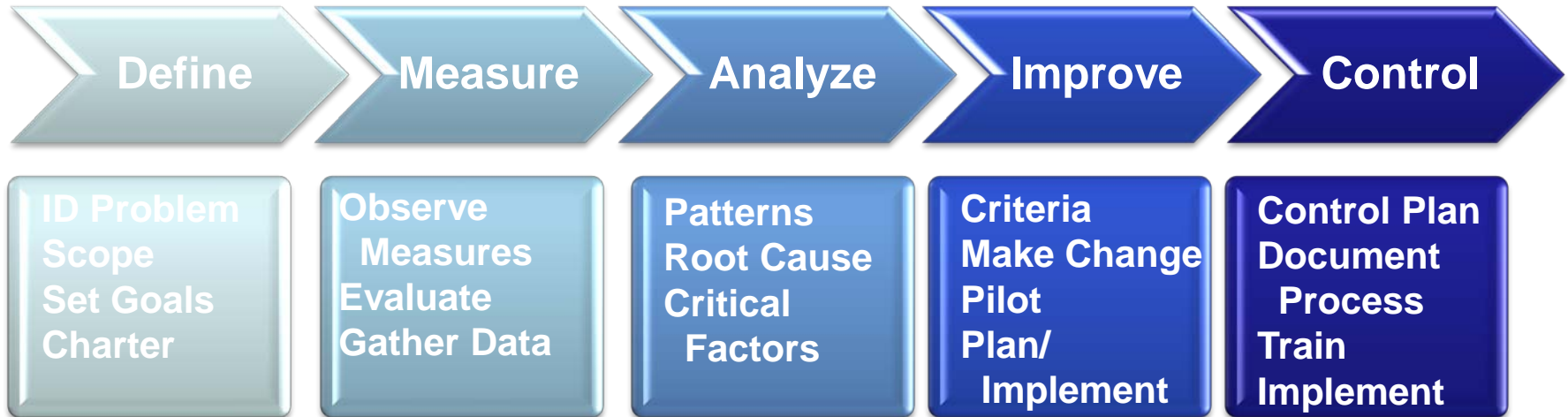
High Maturity & Six Sigma

- Expect you to look deeper into the data
- Metrics become even more important
- Are processes consistent?
- Are operators consistent?
- Are there stable trends (predictable)?
- What is the variability?
- Identify sub-processes that should be statistically managed
- Identify improvement opportunities



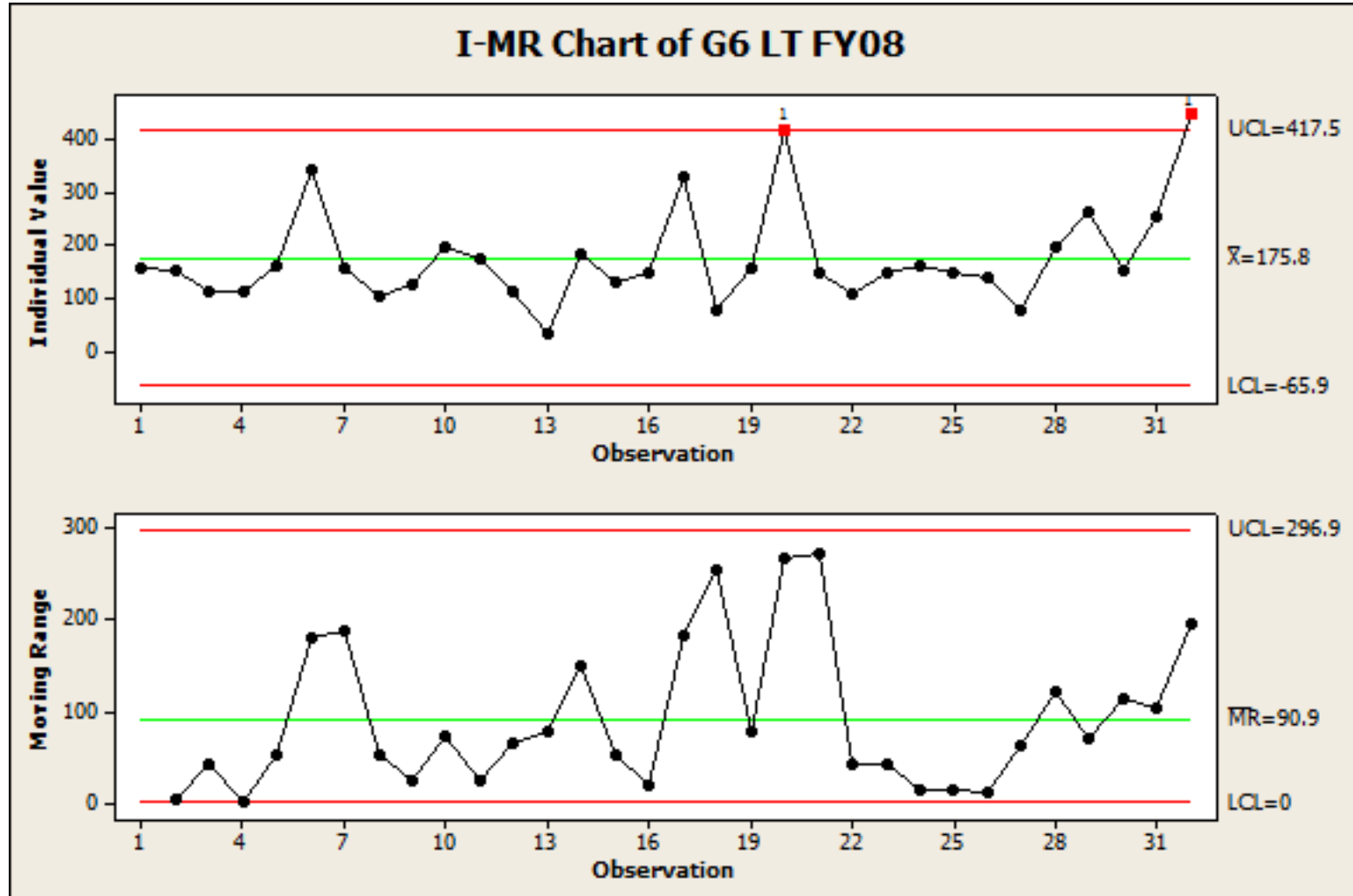


DMAIC Methodology



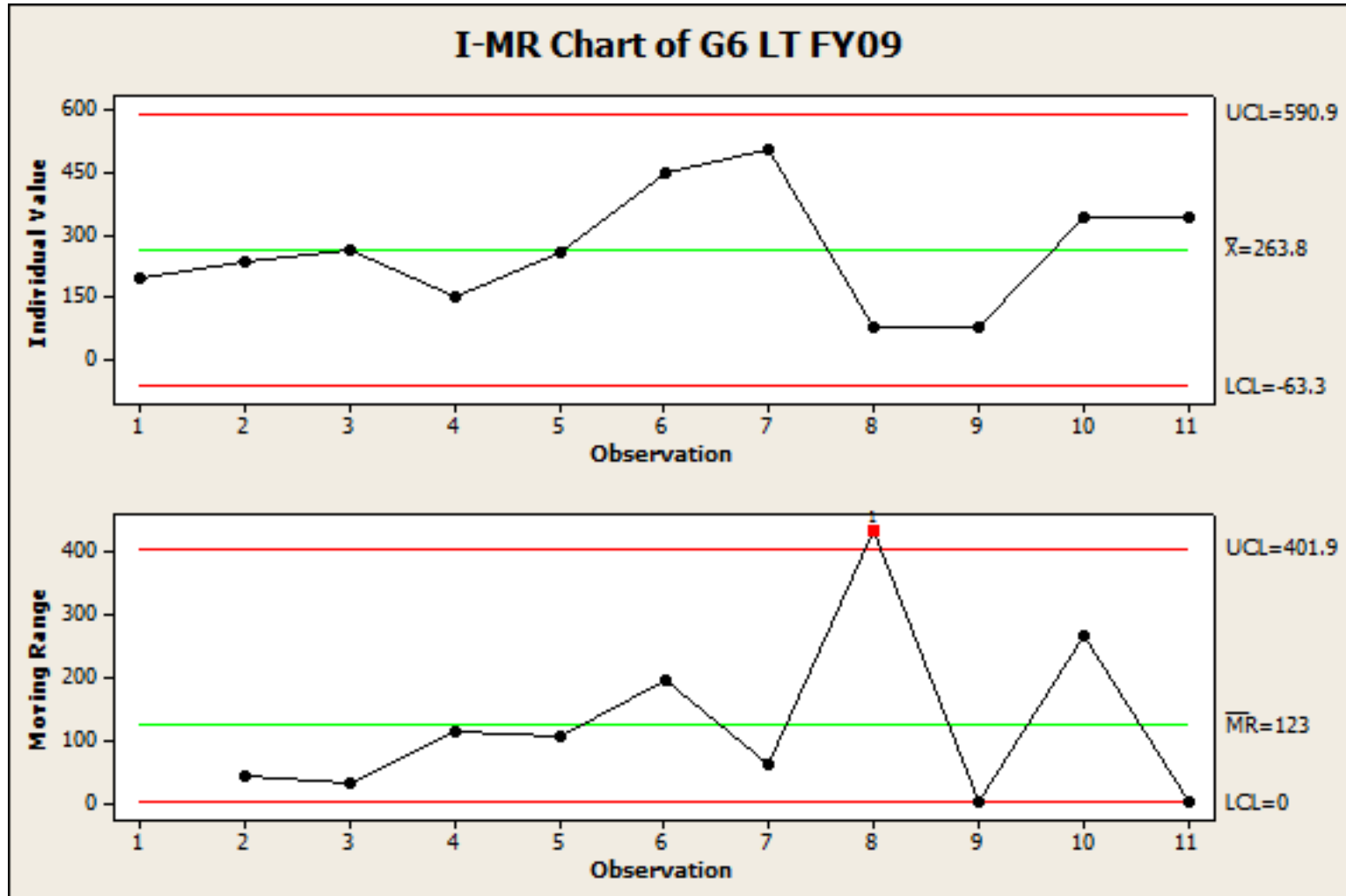


FY08 Lead Time





FY09 Lead Time

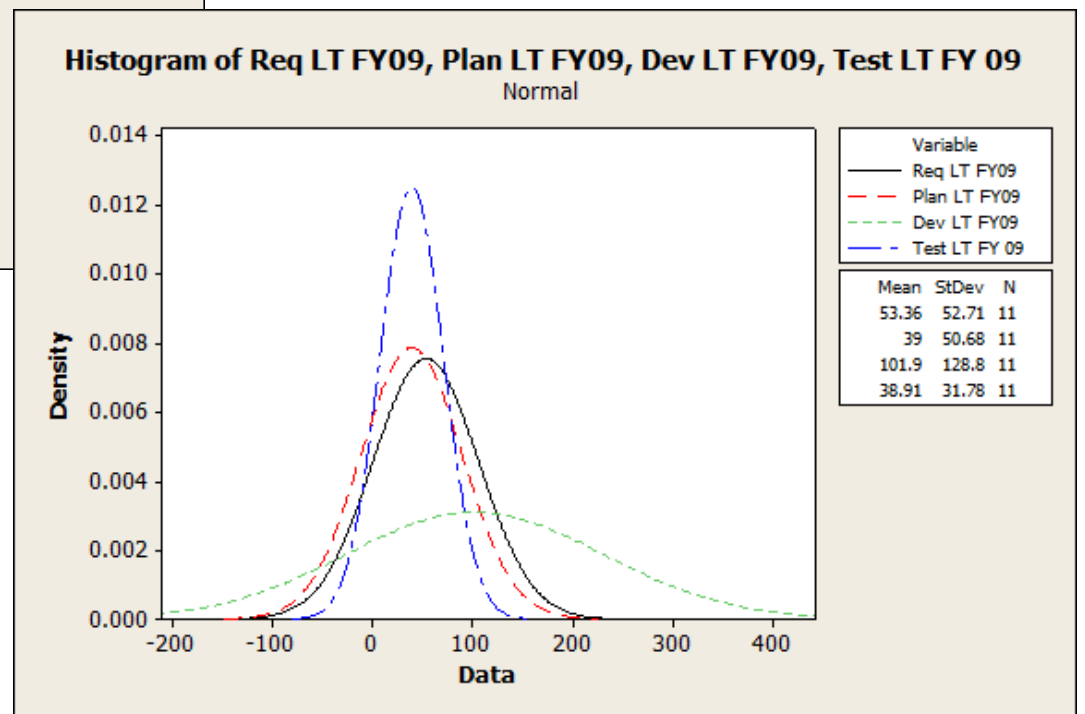
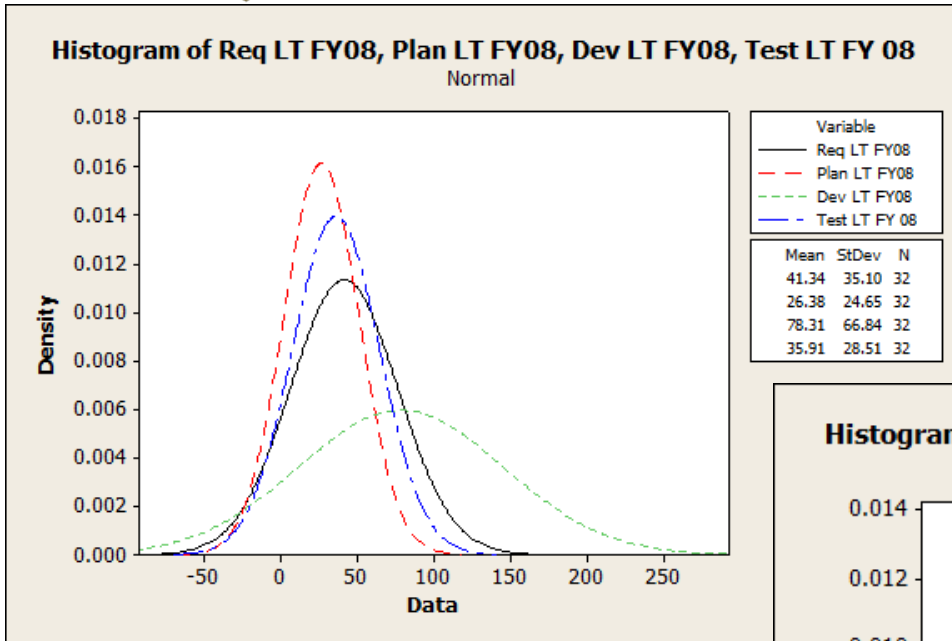




More Data

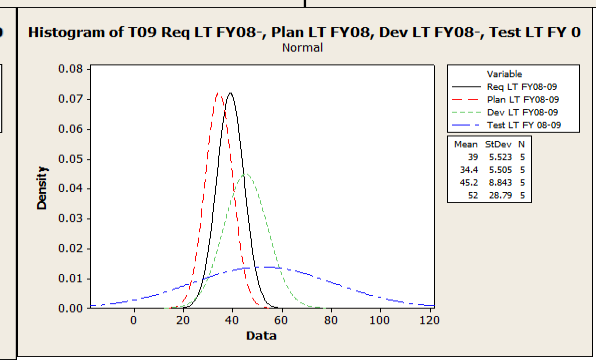
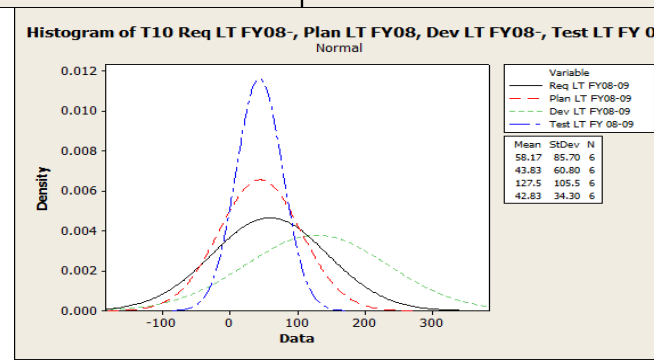
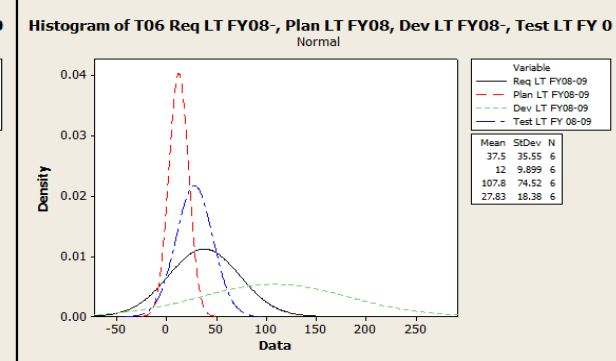
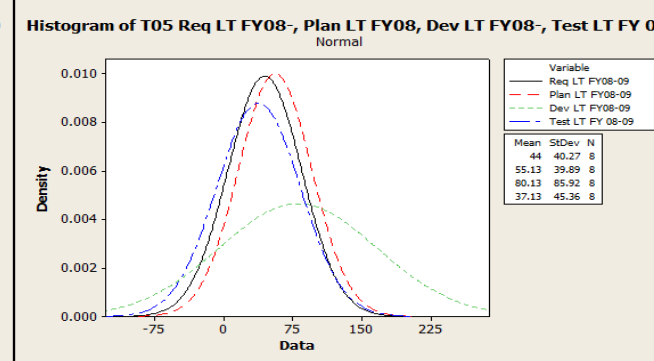
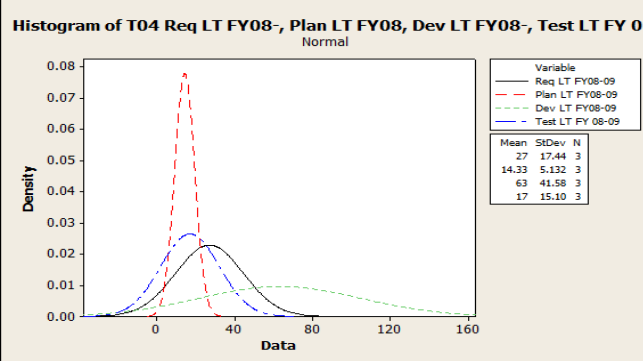
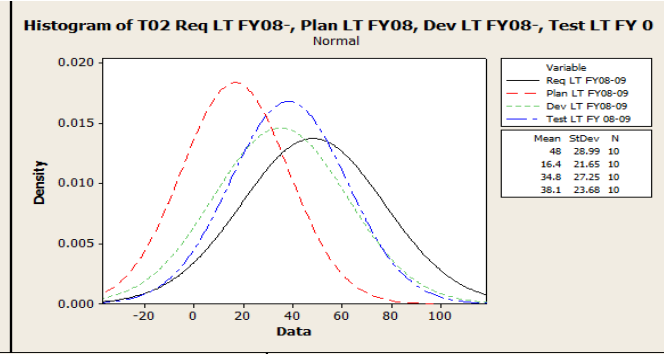
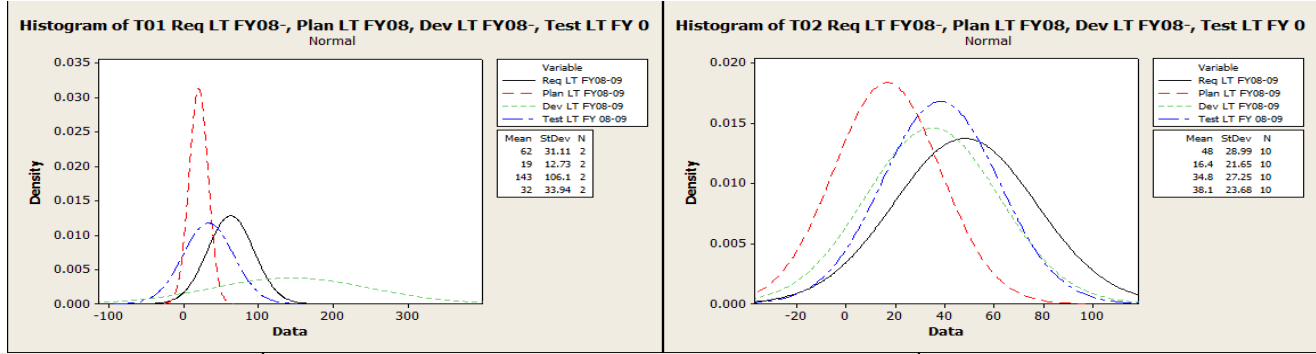


Larger jobs but Loop 3 stayed close to spec even though job size and LT increased.





Variation Among Teams





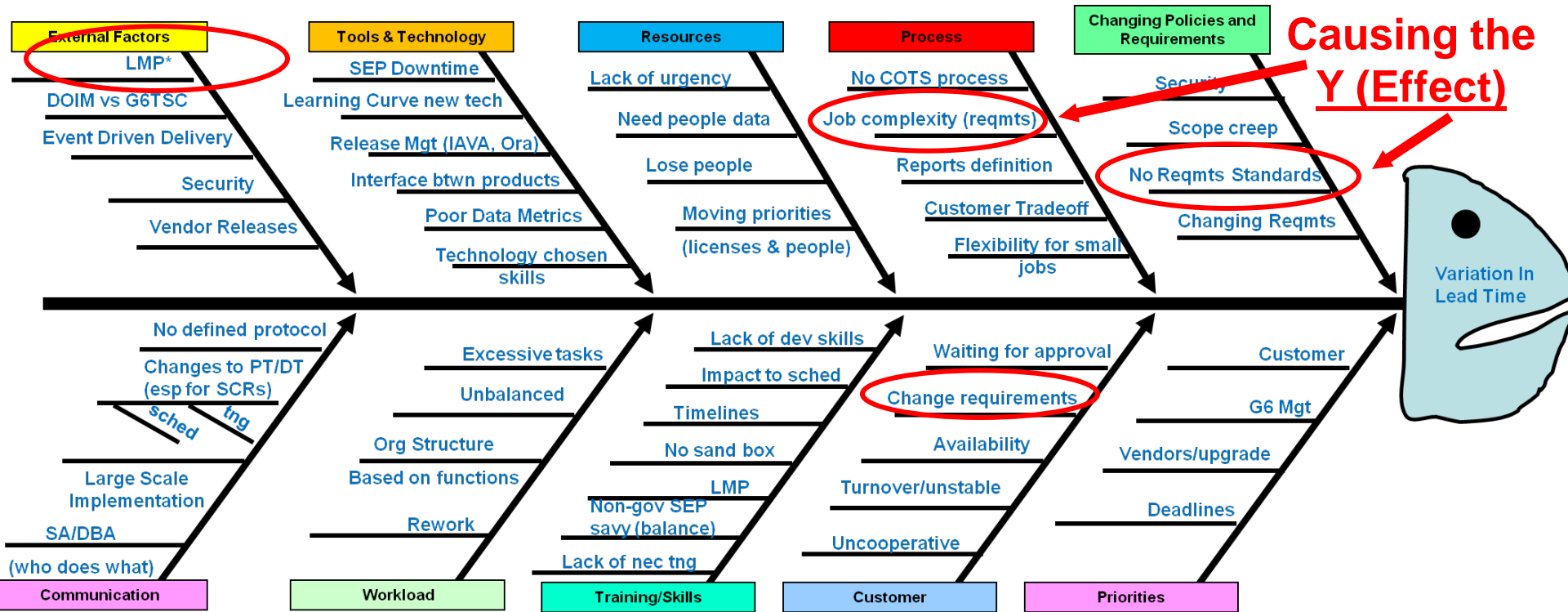
Now What?

- Root Cause Analysis – Fishbone
- Identified need for Requirements Standards and consistency across Team Leaders (TL)
- Suggestion made to review data by TL for standardization opportunities



Fishbone Diagram

**Critical Xs
That are
Causing the
Y (Effect)**





Reality

- Mean is out of control!
- Need to reduce the variation in the Requirements Development sub-process
- Requirements Complexities are inconsistent



Next Steps



- Conducted Rapid Improvement Event
 - Defined new requirements standard
 - Defined new criteria for requirements complexity
 - Established Technical Specification for improved design
- Pilot Changes



Ah Ha! Results

- Identified key sub processes to control
- Identified root causes which became improvement opportunities
- Created new requirements standards
- Improved process for identifying complexities
- Piloting changes
 - Teams predict faster cycle time
 - Improved testing
 - Better quality software

OPP
SG1 – Establish
Baselines
& Models

CAR
SG1 – Determine Causes
Of Defects
SG2 – Analyze Causes

QPM
SG1 – Quantitatively Manage
the Project



Summary

- CMMI and Six Sigma work well together
- We are using the model and methodology for the right reasons
 - Tied to business goals
 - Continuous Process Improvement
- Higher Maturity is worth the effort
 - Improved data based decision making
 - Reduced variation
 - Improved quality



Questions?