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DEFINING THE FUTURE

How Six Sigma Organizations Implement CMMI Level 5

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Background

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- **CMMI and Six Sigma are two well-known process improvement approaches with strong synergies**
- **When an organization knows the tools and methods of Six Sigma, organizational and project implementations take a more customer-focused perspective, and often yield greater value than traditional Level 5 implementations**
- **In this presentation, two leading Six Sigma and CMMI Level 5 organizations will share the ways in which Six Sigma has shaped their high maturity practices**

Agenda

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- **A Tale of Two Organizations**
- **Six Sigma Approach for Quantitative Management**
- **Example**

A Tale of Two Organizations

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Organization A

- **200 people, one building**
- **10 projects for 3 clients; all fixed-price; all developing banking SW**
- **Deployed ML5 practices as a competitive discriminator during organization stand-up**

Organization B

- **18,000 people, offices in all 50 states**
- **200+ projects for 20+ clients; fixed-price, cost-plus, LOE; SE, SW, HW, services**
- **CMMI ML5, ISO 9000, AS9100, etc.; continuously re-organizing and acquiring new pieces of the organization**

How might their high maturity practices vary?

High Maturity Implementations

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Organization A

- Organizational goals – make a profit (productivity, low fielded defects)
- Project goals – same as the organizational goals
- Organization builds baselines and models around productivity and defects
- Projects select peer review and testing subprocesses for quantitative management
- Projects follow CMMI practices

Organization B

- Organizational goals – satisfy shareholders (growth, stability)
- Project goals – all different because of different domains, different customer needs
- Organization builds baselines and models around productivity and defects
- Projects select a wide variety of subprocesses (e.g., training delivery, action item closure, estimation, field support, etc.)
- Projects follow Six Sigma approach

Focus in a Six Sigma Organization

- **Are you measuring the "right things"?**
- **How do you know what's right?**
- **Stay focused on getting your product to your customer as promised!**
- **Budget and monitor the value-producing processes.**
  - The ones that transform inventory into finished product

“Things” flow through a process

The flow of requirements through the processes is our chief concern

“Things” are what customers pay for…

- **In manufacturing, materials are the things**
- **In design and development,** requirements **are the things**
- **In services, external Customer needs are the things**
- **In administration, internal Customer needs are the things**

Identify the Project's Value Stream

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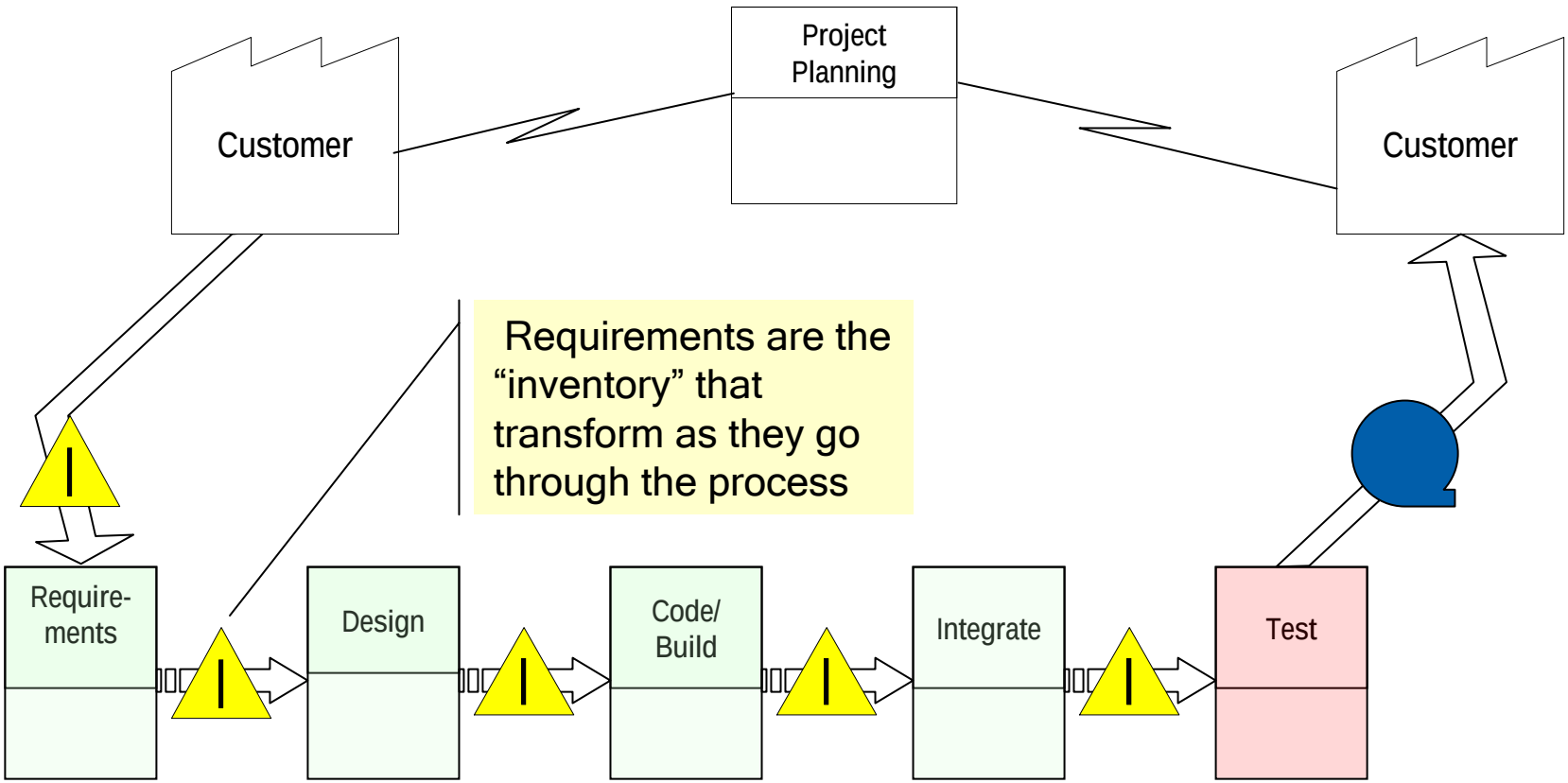
- **The transformation of requirements into product features and functions for which Customers pay money**



Identify the Measures

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For each value-added or value-producing process…

- **Identify what constitutes the “inventory”**
- **Identify how the “inventory” is measured**
- **Establish the measure for the rate of transforming the “inventory” into “product”**

Collect and Analyze

- **Collect data for each value-added, value-producing subprocess**
- **Collect at regular intervals**
  - Use voice of the process
- **Analyze the data**
  - Establish the statistical understanding
  - This is the “Process Performance Baseline”
- **Compare against the allocated budget (subprocess capability)**

Assess the Overall Ability to Achieve

- **Incorporate the data from the "statistical understanding" into the process map**
  - The Process Performance Model
- **Run simulations to assess the project's ability to "get there from here"**
- **Identify needed improvements**
  - Use the simulation to make decisions

Example – Discrepancy Reports

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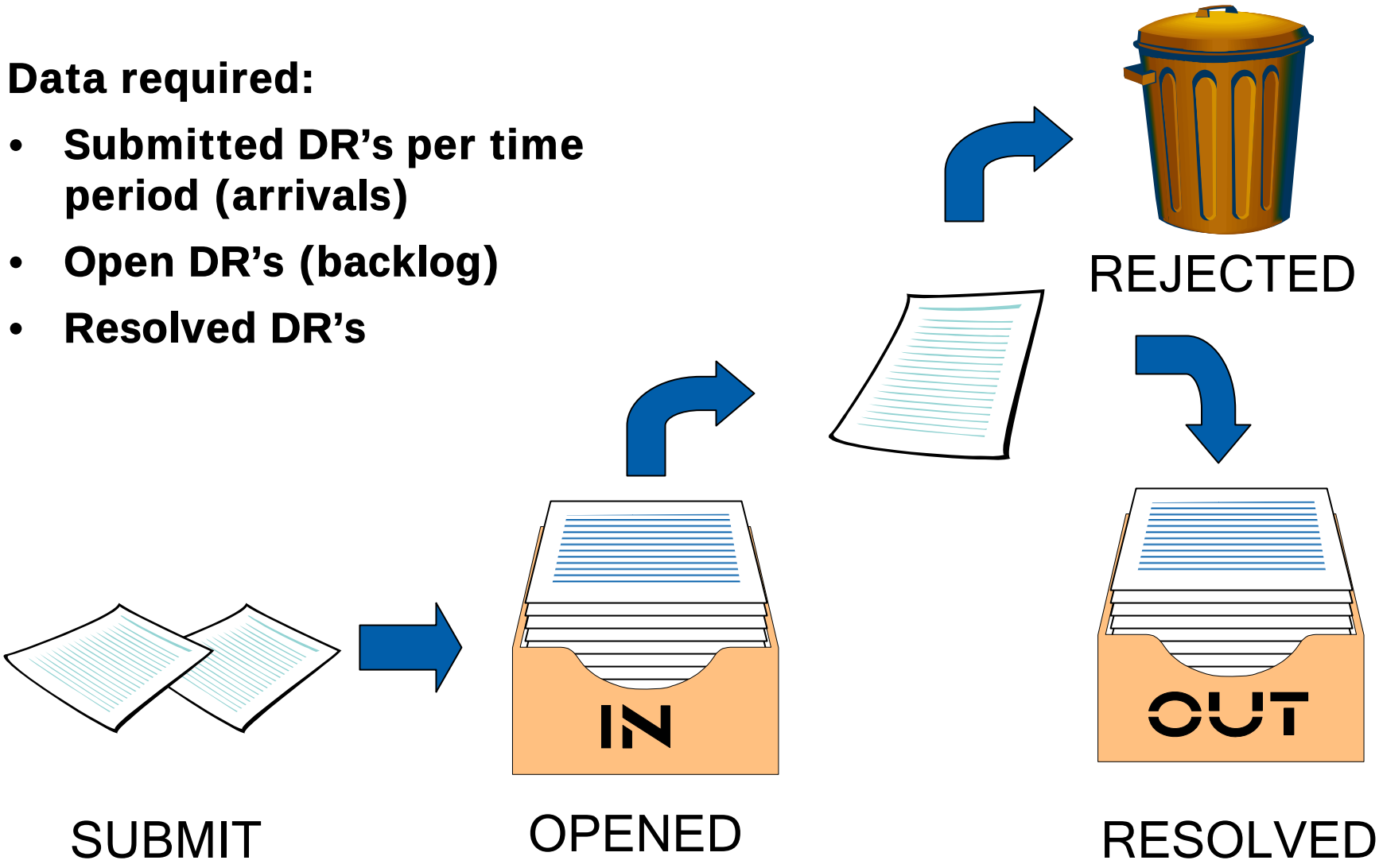
Data required:

- **Submitted DR's per time period (arrivals)**
- **Open DR's (backlog)**
- **Resolved DR's**



Categorize DR's

1. Complete Failure: **System crashes**
2. Partial Failure**: Required functionality does not work, and no workaround**
3. Partial Failure**: Required functionality does not work, but a workaround exists**
4. Cosmetic**: Defect does not materially affect any functionality**

Collect a time series of measurement data about DR submittals

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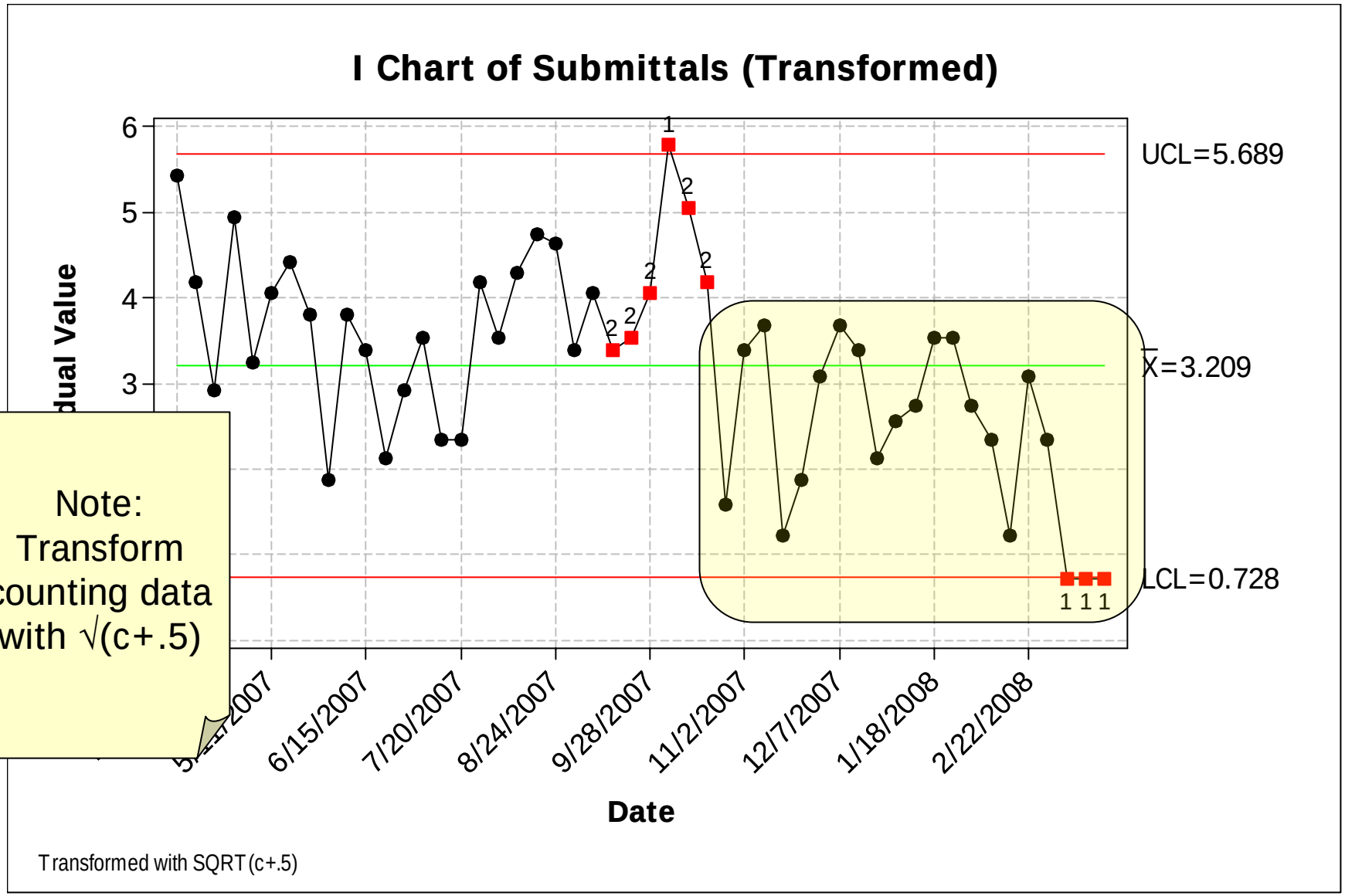
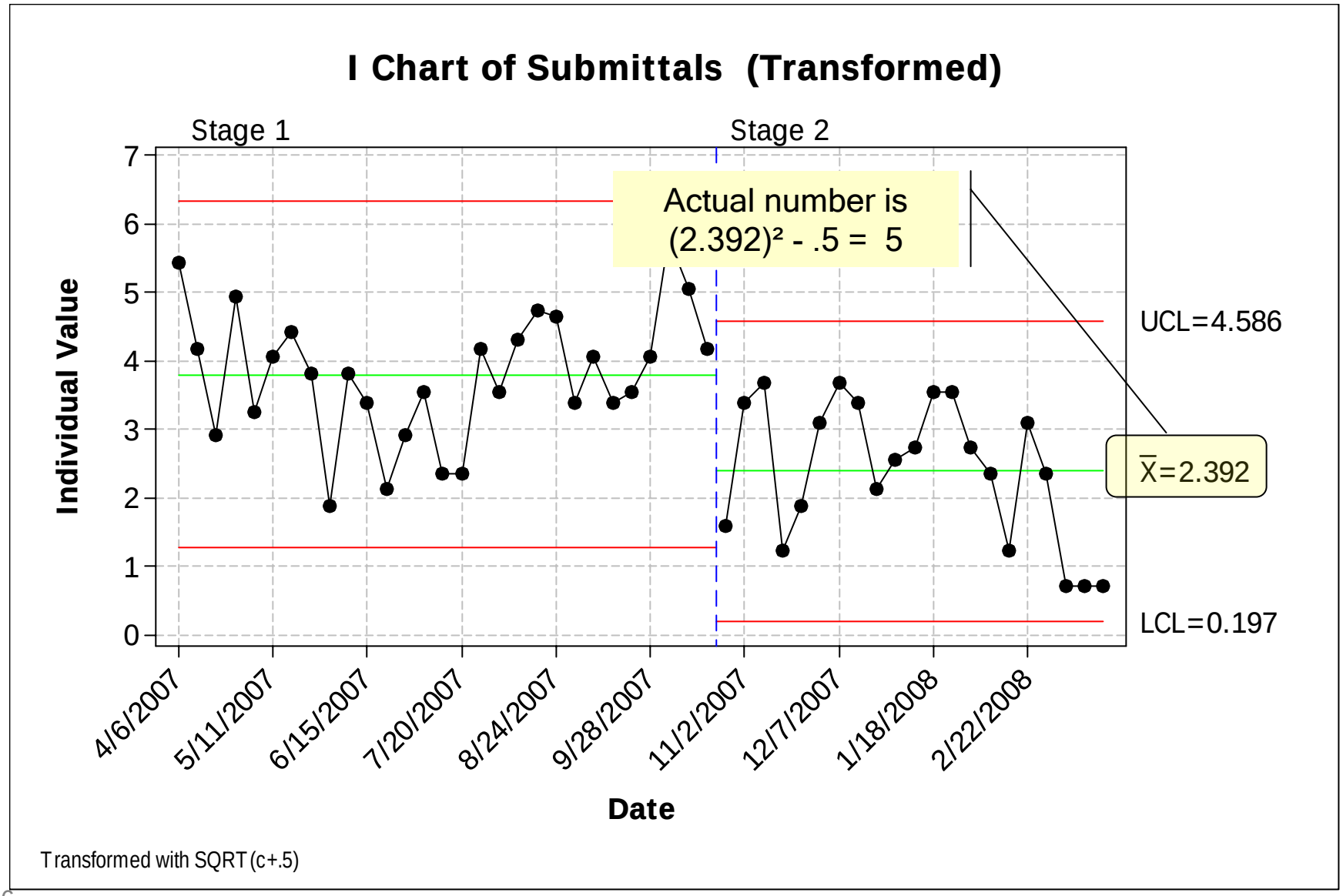
Date	Submittals	Resolved	Open
4/6/2007	4	0	4
4/13/2007	7	2	9
4/20/2007	6	3	12
4/27/2007	12	6	18
5/4/2007	13	:	:
5/11/2007	19	:	:

Analyze the Submittal data with a control chart

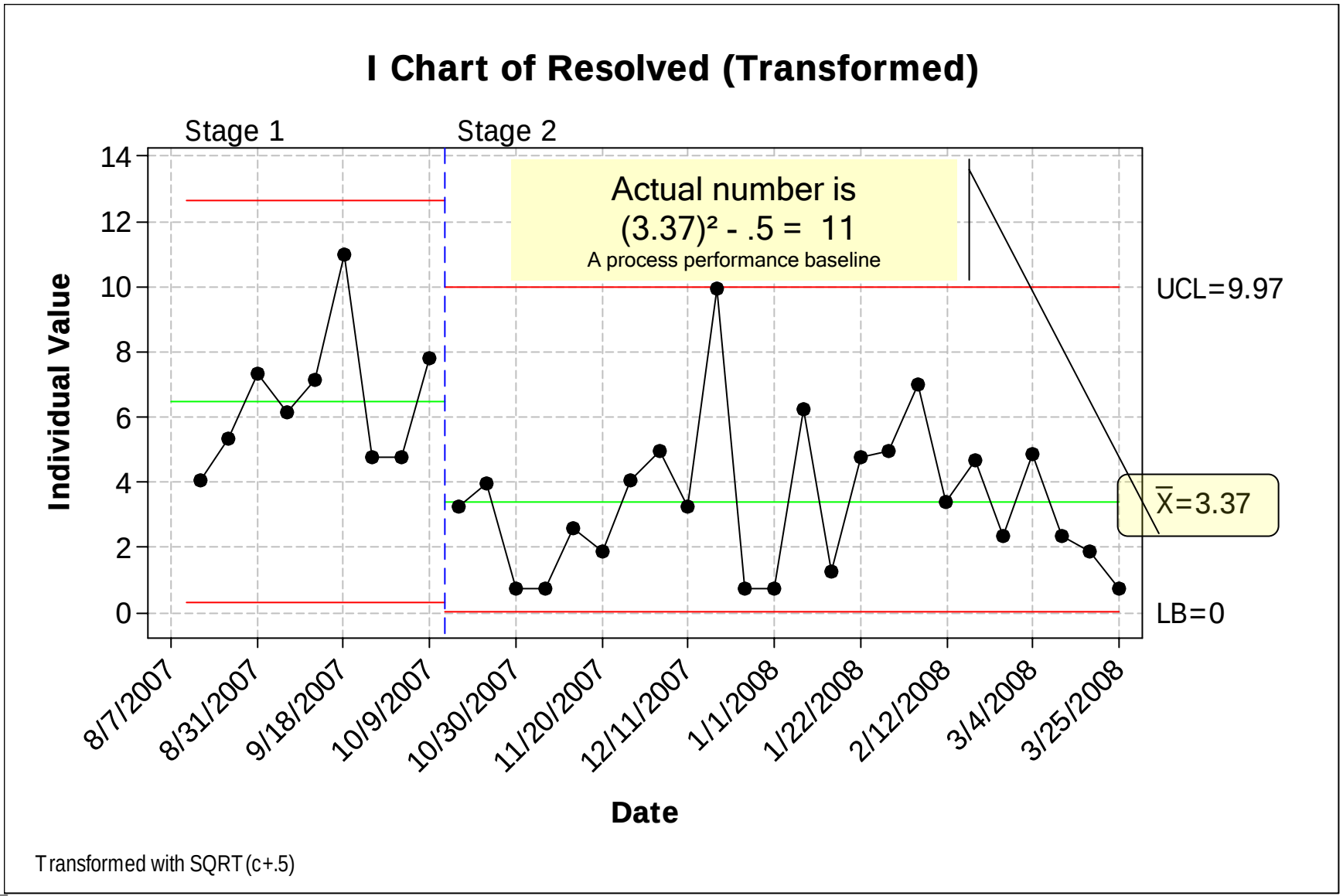


Note: Transform counting data with $\sqrt{(c+.5)}$

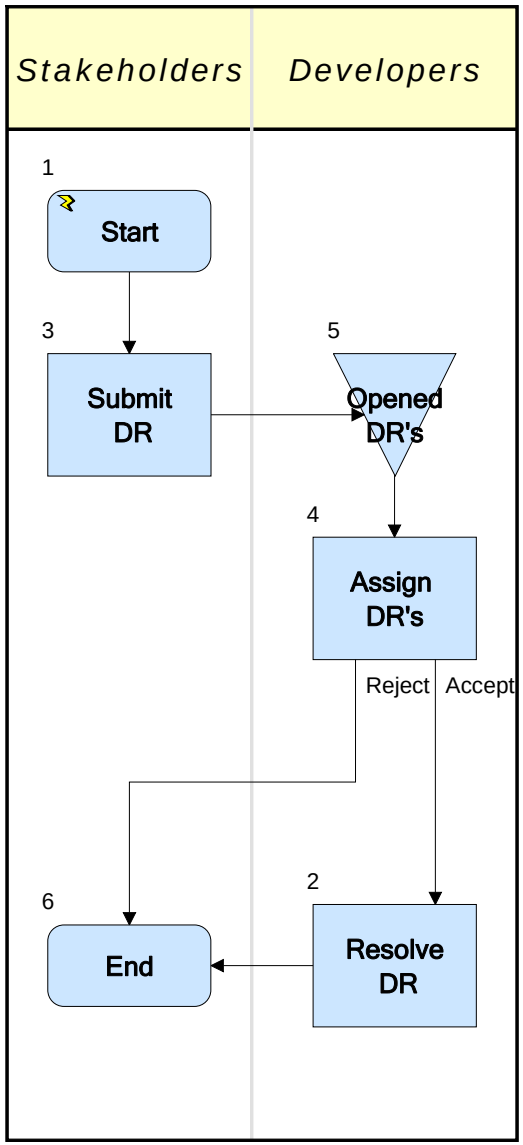
A shift took place about October 26; use current performance



Likewise, analyze Resolved with a control chart

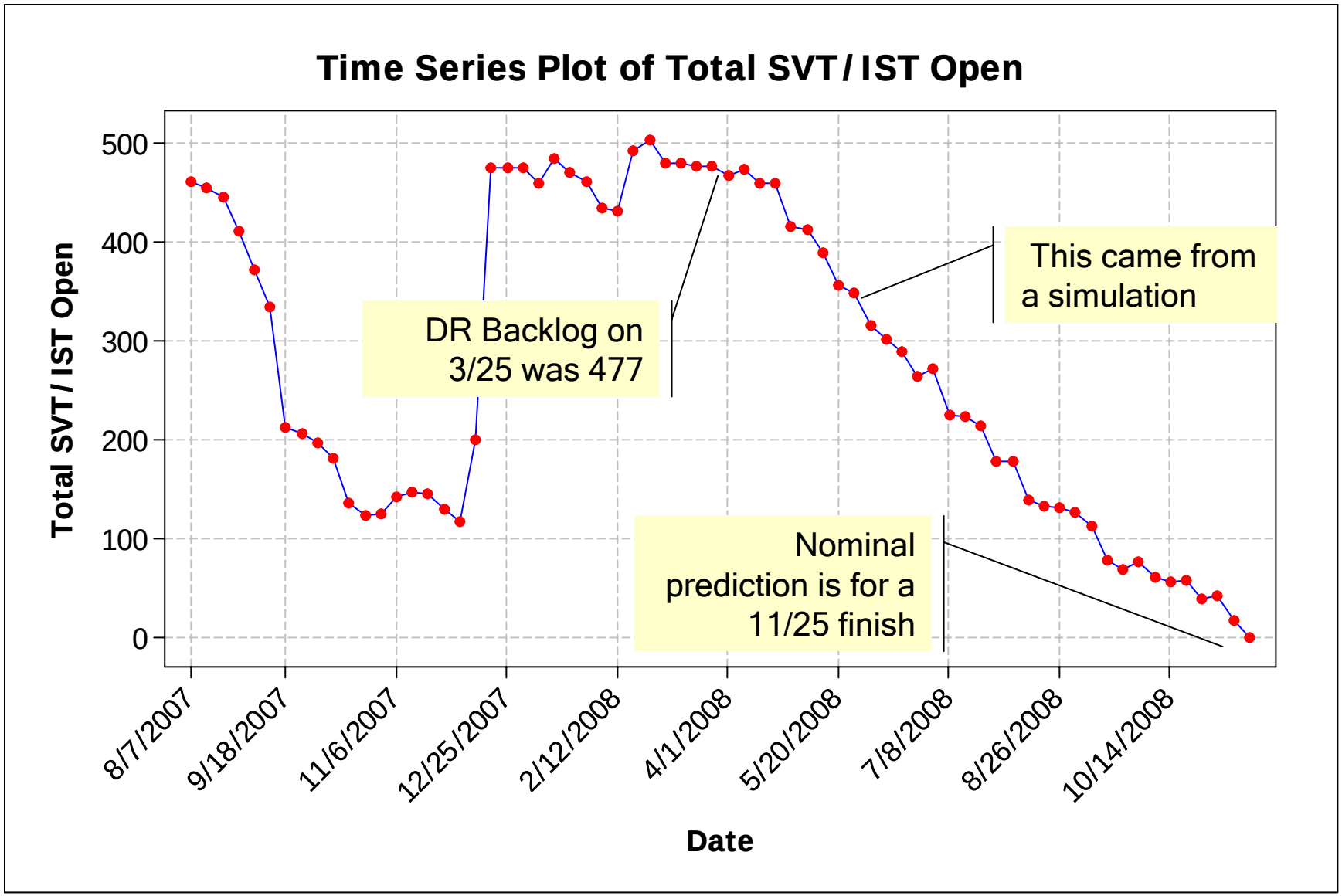


Simulate the process using the data

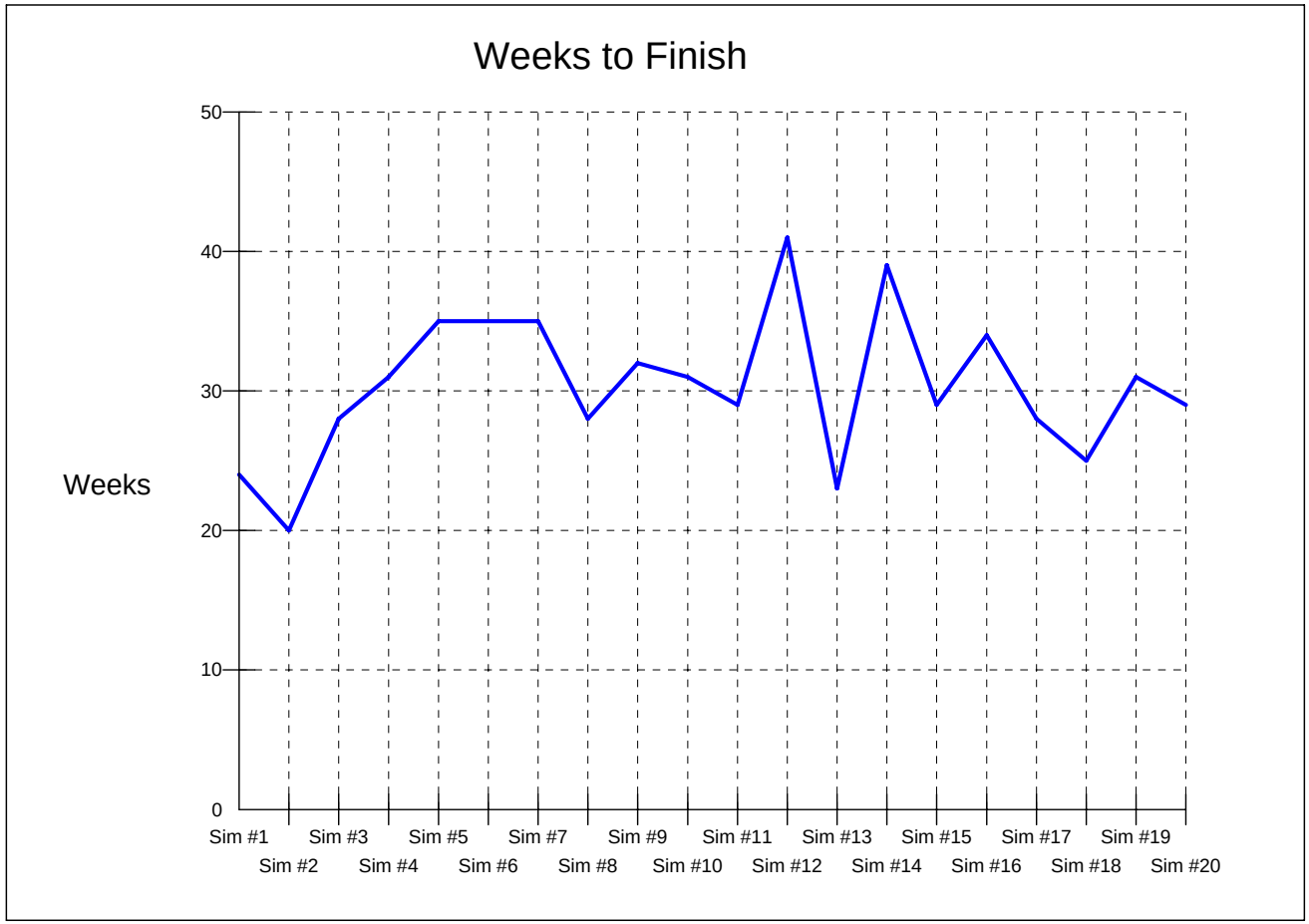


- **In other words, Create a "Process Performance Model" using the "Process Performance Baselines"**
- **Model adjustments may include:**
  - "Inventory" arrival rates
  - "Transformation" rates
  - Staff levels and attrition
  - "Standard" work schedule

Analyze the open DR's with a time series chart



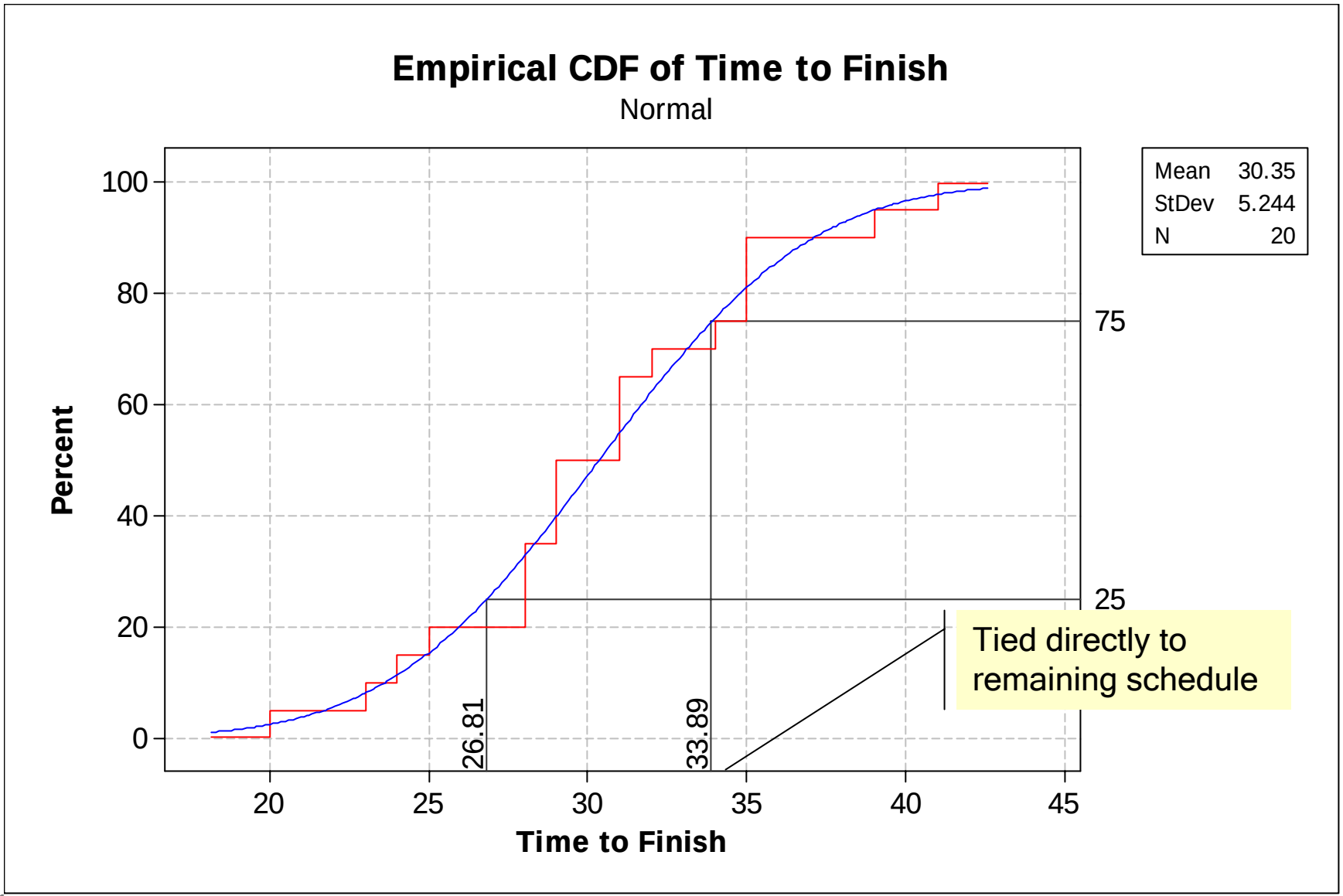
Simulate the DR work-off



Count

Sim #1	Sim #2	Sim #3	Sim #4	Sim #5	Sim #6	Sim #7	Sim #8	Sim #9	Sim #10	Sim #11	Sim #12	Sim #13	Sim #14	Sim #15	Sim #16	Sim #17	Sim #18	Sim #19	Sim #20
24	20	28	31	35	35	35	28	32	31	29	41	23	39	29	34	28	25	31	29

Analyze the results with a CDF



Predict Outcomes

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- If defect arrivals and resolution stay “as is”; defects will not add risk to the end date
- Complete similar analysis for the other value-producing processes

Summary

- Are you “Getting there from here”?
- Understand what produces “value” for the customers
- Set performance budgets
- Measure the value-producing processes
- Model and analyze performance