IBM Software Group

Practical Approaches to Development Governance

Rational. software

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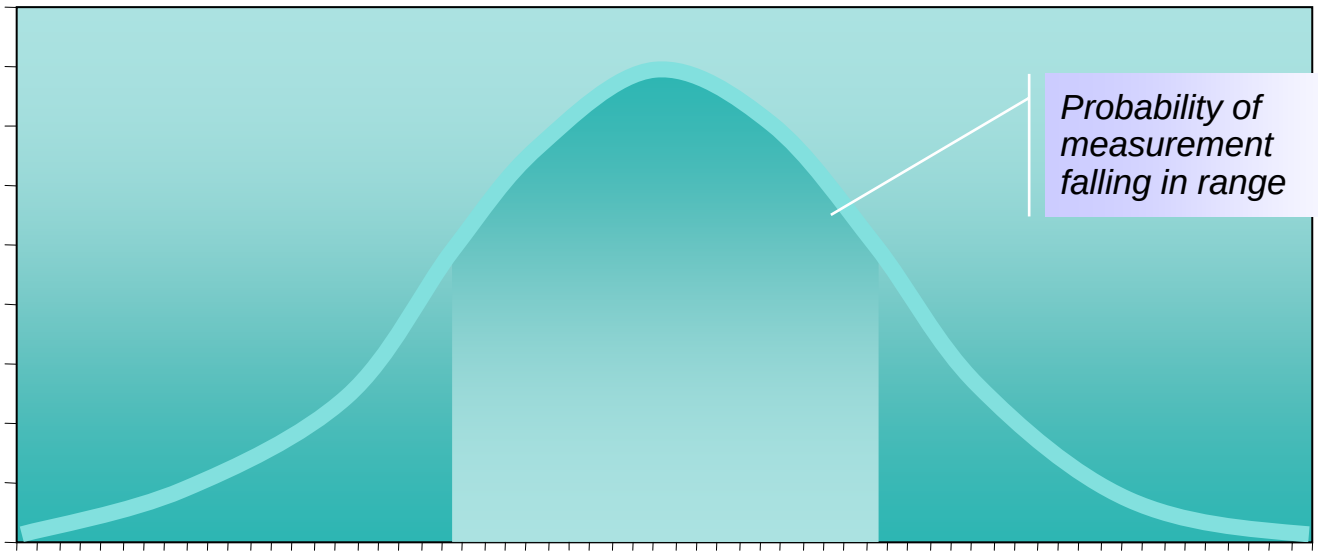
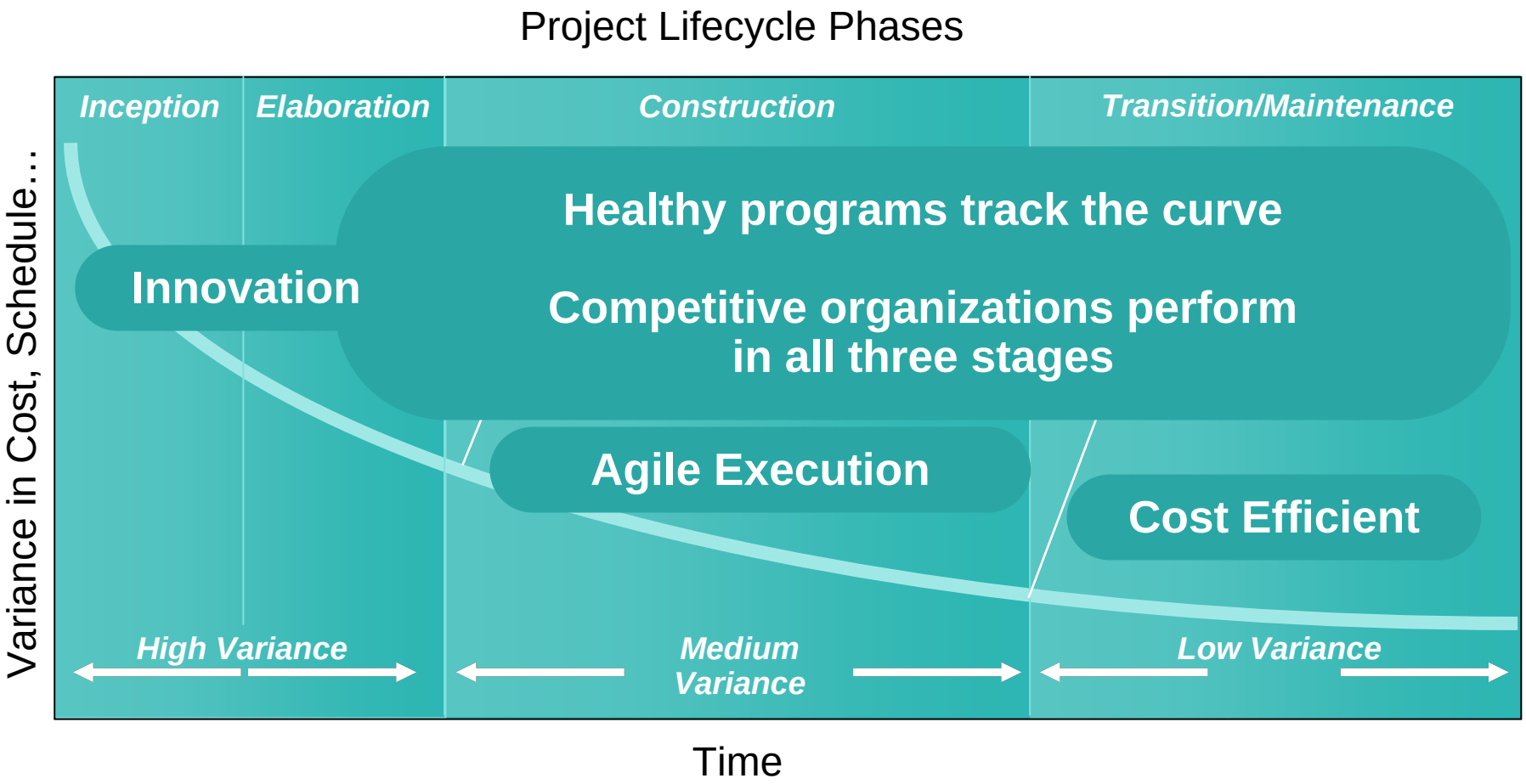
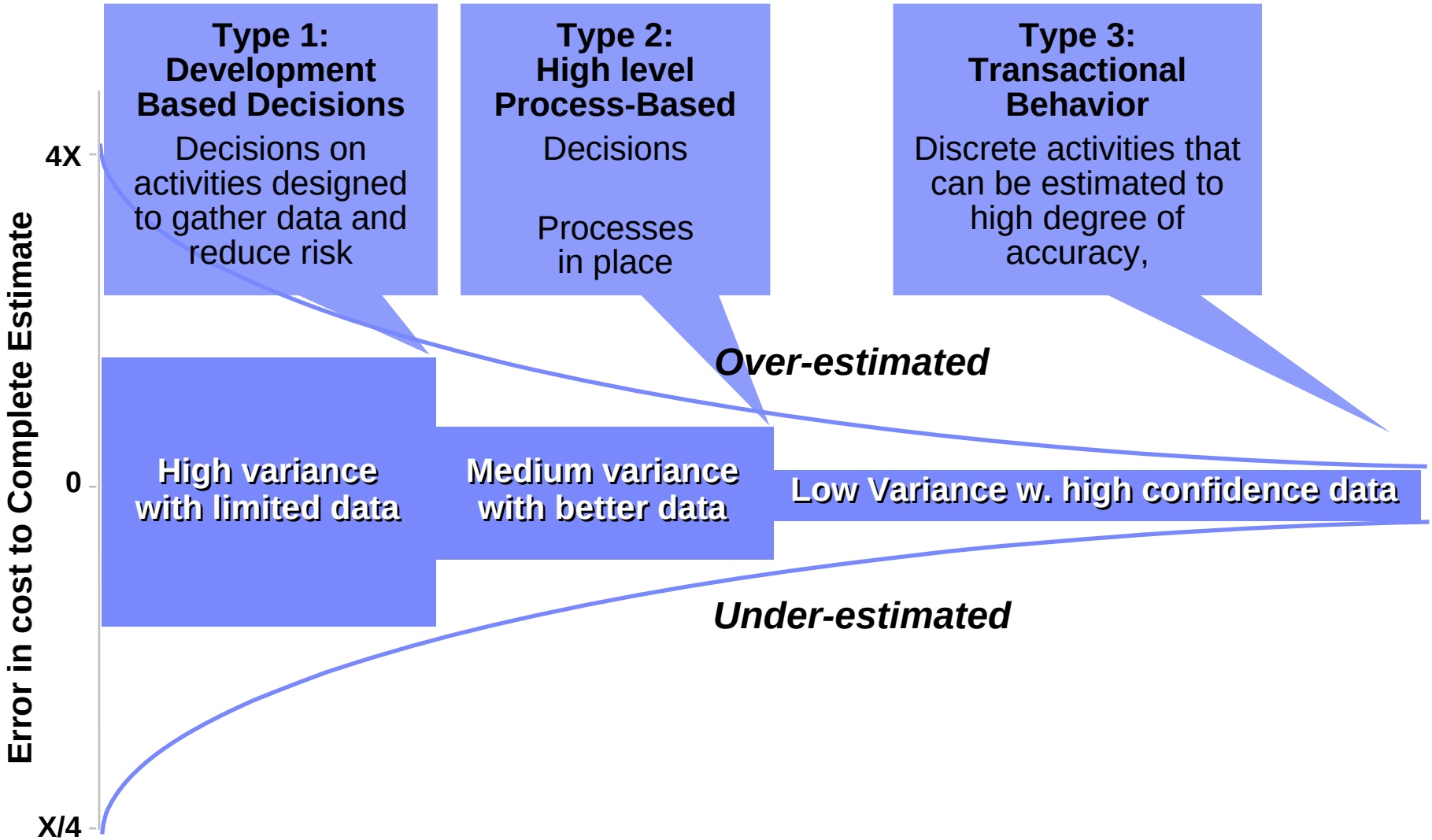
Program parameters (cost, schedule, effort, quality, …) are random variables



Development Dynamics



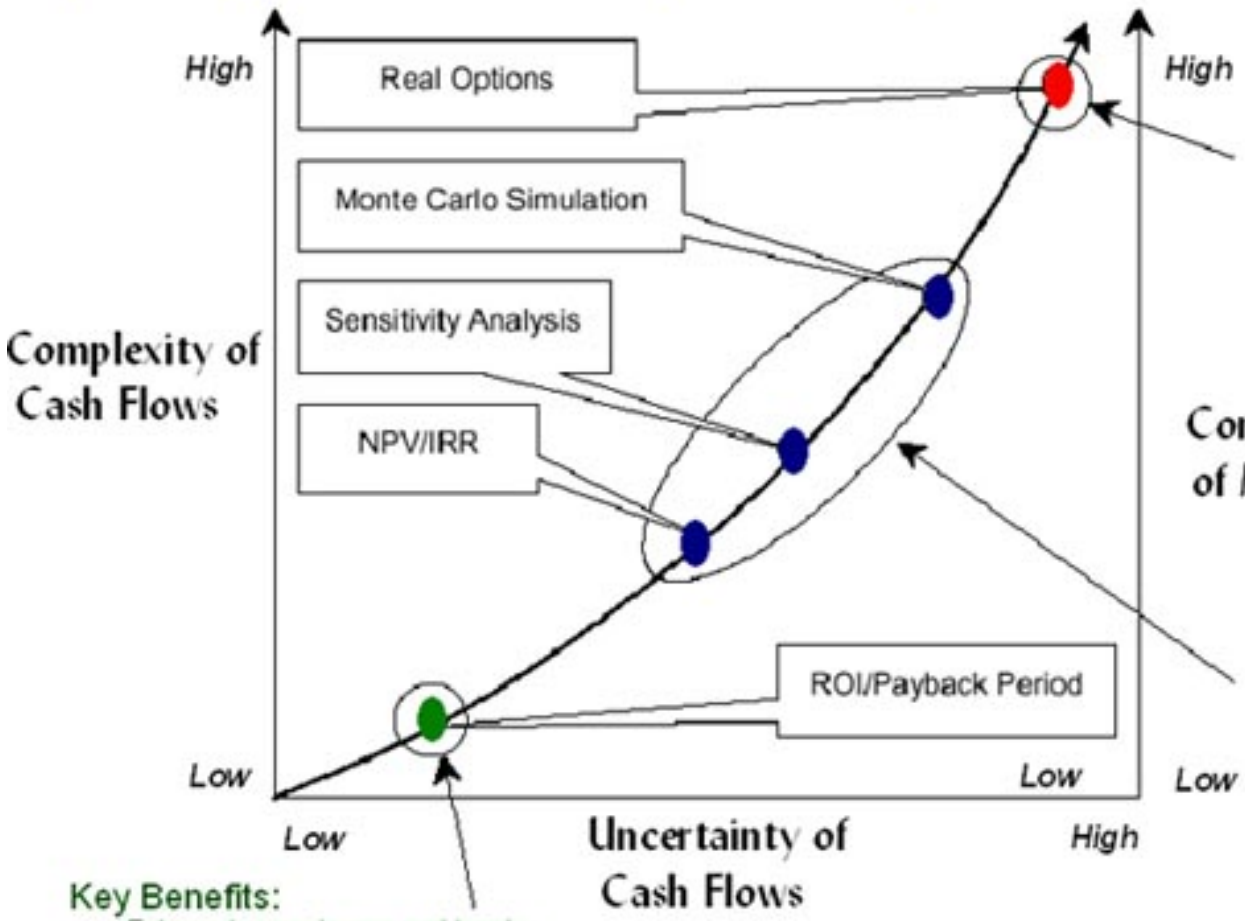
Process Phases Should Focus on Risk Reduction



Project Cost Comments

- **Organizations spend time at phase I**
  - Gathering data to make decisions
  - Not all parameters are known
  - Defining requirements
  - Defining architecture
- **Organizations spend money at phase II and III**
  - Test and Product Support get added to development costs
  - Development gets defect fixing overhead in addition to new development
  - Test adds more tests as defects are uncovered in product usage
  - In addition, more platforms are supported and the regression tests become larger
  - Product support becomes larger as product usage becomes pervasive

Applicability of Valuation Analysis Techniques



Key Benefits
- Highly flexible and accurate

Applicability:
- Particularly well suited to technology investments; extreme level of complexity may limit applicability to only large, intricate investments

Key Benefits
- Able to value cash flows temporally and adjusted for risk

Applicability:
- Well suited to all categories; Monte Carlo simulation and sensitivity analysis particularly well suited to technology and capability investments

Key Benefits:
- Extremely easy to use and teach

Applicability:
- Best suited to short-term utility investments; both metrics lose utility when project is risky, complex, long-lived or competing with alternative investment opportunities

The Key To Remember Is That Different Valuation Techniques are Required for Different Levels of Risk

- One of the great weaknesses of NPV is that it assumes business conditions will remain constant for the duration of the analysis
- This is rarely the case in software unless the duration is on the order of a year or at most two
- Thus to account for the risk of change, one has to use things like real options or sensitivity analysis
- Similarly in changing conditions of risk in the software development lifecycle, one has to use metrics and techniques that adapt to the changes in risk over the lifecycle
- However, there are some areas of the lifecycle that are amenable to standard techniques.

Metrics Recommendation

ON DEMAND BUSINESS™

A Few Rules For Measurement

- Trends are More Important than Point Values
- Initially use metrics to improve projects rather than compare projects
- Initially defect density used to measure risk. In later stages defect density used to measure product quality
- Forecasts initially used to measure risk, at the end used to plan the projects

Strategy for Metrics

- In Initial phases with high development risk,
  - Objective is revenue growth
  - Measure a few parameters very often
    - Low overhead, also low latency for data
    - In addition much volatility of metrics so they need to be tracked often
    - This will allow for adjustments to be made quickly in the projects
    - Metrics should cover the entire lifecycle
    - Initial phases should be characterized by fast cycle times
- As revenue risk increases, more testing and support required thus cycle time increases
  - Processes becomes more predictable
  - Objective becomes cost efficiency
  - More metrics can be taken to improve process
  - More metrics have greater granularity for cost improvement

If You Are Not Measuring Any Metrics Start With These:

- Defect Density – Measures Quality of product
- Requirements Volatility – Measures Quality of Requirements and churn
- Project Management Metrics – Cost Performance Indicators (CPI) and Schedule Performance Indicators (SPI)
- Source Lines of Code for the Project
  - As time goes on source lines of code per service
  - One can also start looking at Function Points

Defect Management Evolution

- High Risk – Type 1
  - Defect Density
  - Defects By Priority
  - Defects by Age
- Medium Risk- Type 2
  - Defect Density
  - Defects By Priority
  - Defects by Age
  - Defects by Service
- Low Risk – Type 3
  - Defect Density
  - Defects By Priority
  - Defects by Age
  - Defects by Service

Requirements Management Evolution

- High Risk – Type 1
  - Use Cases:
    - Analyzed
    - Traced to Tests
    - Volatility
  - **URPS Requirements**
    - Analyzed
    - Traced to Tests
    - Volatility
- Medium Risk- Type 2
  - Use Cases:
    - Analyzed
    - Designed
    - Traced to Tests
    - Volatility
  - **URPS Requirements**
    - Analyzed
    - Traced to Use Cases and Tests
    - Volatility
- Low Risk – Type 3
  - Use Cases:
    - Analyzed
    - Designed
    - Traced to Tests
    - Volatility
  - **URPS Requirements**
    - Analyzed
    - Traced to Use Cases
    - Traced to Tests
    - Volatility

Validation and Test

- High Risk – Type 1
  - Test Cases Planned
  - Test cases Failed
  - Total test cases executed
- Medium Risk- Type 2
  - Test Cases Planned
  - Test cases Failed
  - Total test cases
  - Test Coverage
  - Test case Volatility
  - URPS Metrics
  - URPS Margins
- Low Risk – Type 3
- All of above plus
  - Test Case Volatility by service
  - Test Cases Failed by service

Iterative Development – Project Management

- High Risk – Type 1
  - Schedule and Cost performance indices
- Medium Risk- Type 2
  - Predicted Size
  - Predicted Productivity
  - Actual Productivity
- Low Risk – Type 3
  - Predicted Defect Density
  - Predicted Defects Per Unit Time

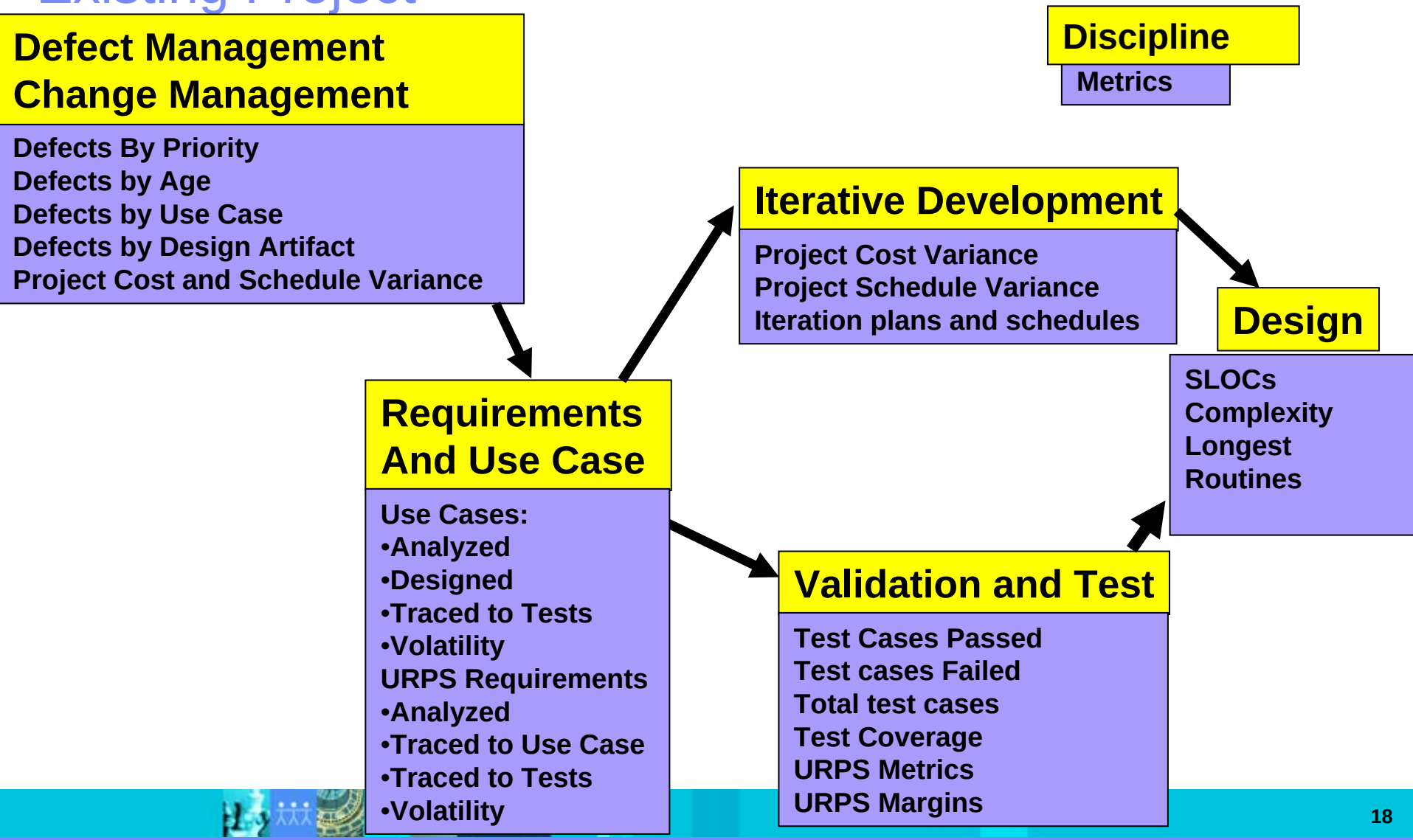
Design Metrics

- High Risk – Type 1
  - Total SLOCs or Function Points
- Medium Risk- Type 2
  - Total SLOCs or Function Points
  - Complexity
  - Pattern Scan Results
  - Longest routines
- Low Risk – Type 3
  - Total SLOCs or Function Points
  - Complexity
  - Pattern Scan Results

Deployment Thoughts

- Start with the back end of the process- Defect Management and Build
  - Allows for measurements and baselines changes
  - Reduces risk of process changes causing defects at customer ship
  - Fastest return
- Then go to the requirements management process
  - Bounds SDLC
  - Starts to mitigate highest risk of SDLC
- Very soon after work on testing and iterative development
  - Testing is highest cost
  - Iterative Development is a generally a major culture change
  - Finish with design

Ordering of Implementation For End to End on an Existing Project



The Facts are Our Friends

- When metrics show problems, support the reporter
  - Sometimes the news may not be good
  - Do not shoot the messenger
  - No better way to stop getting the facts
- Use the metrics to support the strategic goals of the organization