

Automated Project Portfolio Management

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Agenda

- Background
- Challenges
- Solution: Automated Management Systems
- Automated System Toolset
 - Project Planning and Scheduling
 - Technical Performance Management
 - Earned Value Management
 - Risk Management
 - Resource Management
 - Defect management

Background

- Global Computer Enterprises (GCE)
 - Systems Integration Organization
 - Federal Government Contractor
 - CMMI
 - Level 3 Certified Organization
 - Pursuing Maturity Level 4
- Projects Managed
 - Various Government Agencies
 - General Services Administration (GSA)
 - Department of Defense (DOD)
 - United States Coast Guard (USCG)
 - Transportation Security Administration (TSA)
 - Domestic Nuclear Detection Office Organization (DNDO)
 - United States Secret Service (USSS)
 - Firm-Fixed-Price Contracts
 - Project portfolio for each Agency or program within the Agency
 - Delivering Earned Value Management for all projects

Project Portfolio Management

- Project Portfolio Management (PPM) is a management approach characterized by treating related projects as part of an overall project investment portfolio
- PPM establishes a set of values, techniques and technologies that enable visibility, standardization, measurement and process improvement across all projects

| PPM | Software Development & Integration |
|--------------------|------------------------------------|
| Project Portfolio | Project / Product Release |
| Project Investment | Project / Deliverable |

PPM Challenges

| Management Process | Challenges |
|----------------------------------|---|
| Project Portfolio Management | Repeatable, integrated execution of all the management processes |
| Project Planning and Scheduling | Work, task breakdown across overlapping projects and shared resources Keeping track of constant schedule changes |
| Technical Performance Management | Micro level work assignment and tracking is time consuming Status checking involves intensive floor management |
| Earned Value Management | Collecting EVM data is labor and time intensive Involves perusing different documents such as project plans, status reports spread across documents and excel sheets |
| Risk Management | Tracking cost and schedule performance while taking risks into consideration is an added complexity |
| Resource Management | Resource utilization to obtain real-time project costs and resource pipeline Management |
| Defect Management | Integrated defect detection and resolution of defects in-place during the course of the projects |
| Business Intelligence | Generating status reports, obtaining measures and quantitative information for a collection of projects is a tedious manual process |

Solution: Automated Management Systems

| Management Process | Solution |
|----------------------------------|--|
| Project Portfolio Management | Automated System to implement and support these management processes |
| Project Planning and Scheduling | Planning with EVM emphasis in mind Predefined and customizable Work Breakdown Structure and Work Distribution Structure in the system |
| Technical Performance Management | Robust Management of tasks Task management and workflow to transition tasks Task Inbox for each project team member Real-time status report on overall project progress |
| Earned Value Management | EVM data obtained from the collective repository of projects, tasks, work-items and activities Financial Controls Early Warning mechanisms |
| Risk Management | Integrated Risk tracking and Risk life cycle management |
| Resource Management | Timesheet functionality integrated with task logging against the work Breakdown |
| Defect Management | Defect collection, tracking and integrated defect resolution task management |
| Business Intelligence | Obtained from the collective repository of project management data E.g. generate real-time EVM reports, productivity measures |

Automated System Toolset

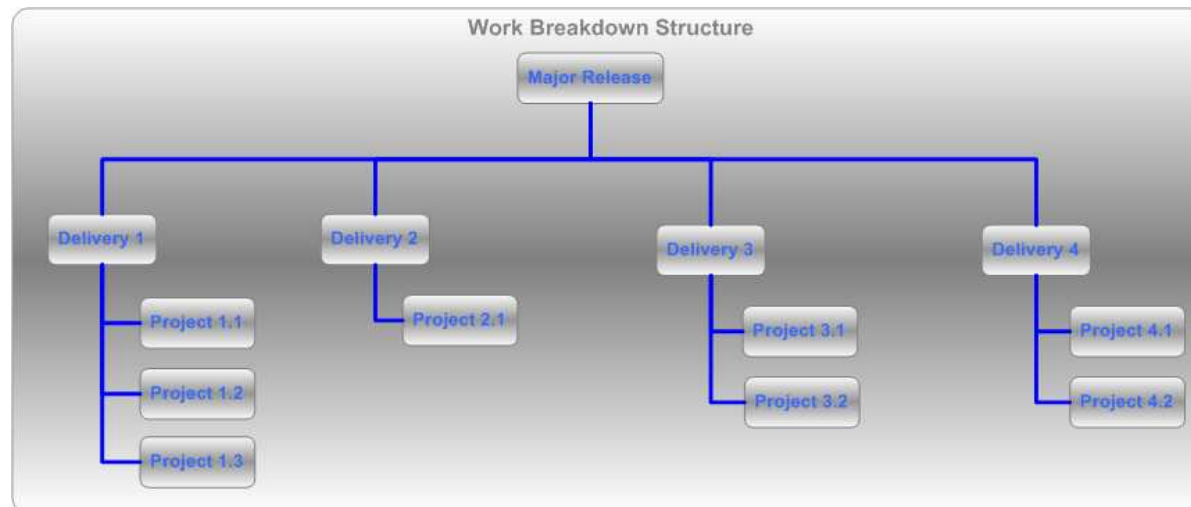
Selection Criteria

- Automated Processes
- Open Source Systems
- Integrated to manage technical, schedule, and cost performance
- Scalable, customizable and extensible

| System | Tool |
|-------------------------------------|------------------|
| Schedule Management | Dotproject |
| Task, Cost and Timesheet Management | Dotproject |
| EVM Data Repository | MySQL Database |
| EVM Reports | Informatica |
| Early Warning System | Php extensions |
| Alerts | Postfix |
| Defect Management | Dotproject, JIRA |

Project Planning and Scheduling

- Project plans are developed with an emphasis on EVM
- Work Breakdown structure
 - Based on PPM
 - Adopt iterative development model
 - Agile practices
 - Granularity: Estimate atomic task assignments at hourly level of detail
- Work Distribution structure
 - SDLC based
 - Distribution across SDLC phases
 - Role based
 - Resource assignment by segregation of duties
 - Dependencies recorded and tracked



Technical Performance Management

- Online Work Management System (WMS)
 - Web-based project management tool
 - Robust portfolio management of projects and micro tasks for all organization
 - Monitor and track all projects and tasks
- Real-time Tracking
 - Project actual % completion available real-time
 - Independent assessment
 - Objective evidences
 - Ability to monitor project progress in real time
 - Slice and dice data across releases, deliveries and projects
- Task Life Cycle Management
 - Online task creation, assignment and completion
 - Task status reporting of complete, pending tasks

Technical Performance: Portfolio Status

| Progress | Project Name | Start Date | End Date | Owner | Status |
|----------|----------------------------|------------|------------|----------------|-------------|
| 60.0% | abcdefghijklmnopqrstuvwxyz | 09/13/2007 | 09/21/2007 | Barbara M. ... | In Progress |
| 75.0% | abcdefghijklmnopqrstuvwxyz | 07/09/2007 | 09/30/2007 | Chantal S. ... | In Progress |
| 100.0% | abcdefghijklmnopqrstuvwxyz | 09/28/2007 | 10/01/2007 | Barbara M. ... | In Progress |
| 96.9% | abcdefghijklmnopqrstuvwxyz | 09/10/2007 | 10/05/2007 | Chantal S. ... | In Progress |
| 100.0% | abcdefghijklmnopqrstuvwxyz | 09/29/2007 | 10/05/2007 | Chantal S. ... | In Progress |

High Level Portfolio Status view

Technical Performance: Project Status

| Pin | New Log | Work | Percent Weightage | External Assesment | P | Task Name | Line Of Business | SDLC Phase | Milestone in SDLC Phase | Technology Stack |
|-----|---------|------|-------------------|--------------------|----|--|------------------|----------------------|----------------------------|-------------------|
| | | Log | 100% | 0% | 0% | <input type="checkbox"/> Service Pack (13) | Operation | | | |
| | | Log | 100% | 0% | 0% | <input type="checkbox"/> Discrepancy in Warning Message format causing issues (4) | Operation | | | |
| | | Log | 100% | 0% | 0% | <input type="checkbox"/> Technical Resolution | Maintenance | Technical Resolution | Technical Draft Resolution | Business Services |
| | | Log | 100% | 0% | 0% | <input type="checkbox"/> Development | Maintenance | Development | Business Logic | Business Services |
| | | Log | 100% | 0% | 0% | <input type="checkbox"/> Functional Certification | Maintenance | Development | Functional Certification | Business Services |
| | | Log | 100% | 0% | 0% | <input type="checkbox"/> Technical Certification | Maintenance | Development | Technical Certification | Business Services |

Project Gantt view

Earned Value Management

- EVM data
 - Real-time data from WMS
 - Estimates
 - Project percent completion
 - Funds Burned
 - Schedule Burned
- Funding Variance controls
 - Automatic alerts when funding variances exceed threshold
- Uniform Spending
 - Permit task performance and work logging only within the budgeted weekly burn rate
- Task and Project Period of performance
 - permits task performance and logging only with the project period of performance of task or project
- Real-time Reports
 - Visibility into SPI and CPI
 - Accurate and timely data
 - Effective decision making

Real-time EVM Report

| Project Name | Period Of Performance (in Days) | Funding Level | Scheduled Days Left | Total Funding Left | Percentage Schedule Burned | Percent Completed | Schedule Variance | Percent Funding Burned | Funding Variance | Projected Earning Per Burn Rate | Actual Earning |
|--------------|-----------------------------------|---------------|---------------------|--------------------|----------------------------|-------------------|-------------------|------------------------|------------------|---------------------------------|----------------|
| Project 1 | 91 | \$356.25 | 52 | \$261.75 | 42.86% | 30.77% | -12.09% | 26.53% | 4.24% | \$94.50 | \$109.62 |
| Project 2 | 91 | \$14,207.74 | 52 | \$10,787.24 | 42.86% | 38.46% | -4.40% | 24.07% | 14.39% | \$3,420.50 | \$5,464.30 |
| Project 3 | 91 | \$494.00 | 52 | \$458.00 | 42.86% | 33.00% | -9.86% | 7.29% | 25.71% | \$36.00 | \$163.02 |
| Project 4 | 91 | \$15,547.12 | 52 | \$13,459.12 | 42.86% | 25.51% | -17.35% | 13.43% | 12.08% | \$2,088.00 | \$3,966.07 |
| Project 5 | 91 | \$4,984.04 | 52 | \$3,724.04 | 42.86% | 38.46% | -4.40% | 25.28% | 13.18% | \$1,260.00 | \$1,916.86 |
| Project 6 | 91 | \$1,004.81 | 52 | \$853.81 | 42.86% | 38.46% | -4.40% | 15.03% | 23.43% | \$151.00 | \$386.45 |
| Project 7 | 91 | \$1,534.62 | 52 | \$702.12 | 42.86% | 46.15% | 3.29% | 54.25% | -8.10% | \$832.50 | \$708.23 |
| Project 8 | 91 | \$2,280.00 | 52 | \$1,272.00 | 42.86% | 46.15% | 3.29% | 44.21% | 1.94% | \$1,008.00 | \$1,052.22 |

Real-time EVM Report

Real-time EVM: Early Warning Mechanisms

- Calculate cost and schedule variances
 - Automated check on each project
 - Calculated from integrated, real-time WMS system
- Identify work variance thresholds
 - Variances exceed acceptable tolerances
 - Schedule burned
 - Funding burned
- Automated alerts when variance thresholds are exceeded
 - Program Management
 - Execution Teams
- Risk Management
 - Identify cost and schedule overrun risks at an early stage
 - Respond more quickly with mitigation strategies

Risk Management

- Risk Identification
 - Risk details such as probability and impact of risk
- Risk Analysis
 - Association with a task (Origin of risk), actual impact (number of days of effort, total dollars for equipment etc.)
- Risk Mitigation
 - Planning changes
 - Risk mitigation tasks created and assigned
- Risk Monitoring and Control
 - Resolution of the risk
 - Implement the tasks for containing the risk
 - Tracking and communication of risk mitigation tasks
 - Budget and cost automatically updated

Resource Management

- Utilization Reports
 - Overutilization
 - Underutilization
- Cumulative timesheet entries from task logs
 - Record and report time worked on a project
- Identify trends
 - Workload
 - Resource management

Users: Projects:

| Users | Week 40 | Week 41 | Week 42 | Week 43 | Week 44 | Week 45 | Week 46 | Week 47 | Week 48 | Week 49 | Week 50 | Week 51 | Week 52 |
|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| S/W Engineer | 22.79 | 22.79 | 22.79 | 22.79 | 22.79 | 22.79 | 22.79 | 22.79 | 22.79 | 41.21 | 41.21 | 22.42 | 22.42 |
| S/W Engineer | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| S/W Engineer | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| S/W Engineer | 30.86 | 30.86 | 30.86 | 30.86 | 30.86 | 30.86 | 30.86 | 30.86 | 17.33 | 17.33 | 17.33 | 14.73 | 14.73 |
| S/W Engineer | 26.71 | 33.17 | 33.17 | 33.17 | 33.17 | 33.17 | 33.17 | 33.17 | 25.32 | 25.32 | 25.32 | 25.32 | 25.32 |
| S/W Engineer | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 | 39.57 |

Real-time Resource Allocations view

Resource Management Contd.

- Timesheet is integrated within the WMS
 - Report by hierarchical work breakdown structure
 - Report by individual user, project, division

| Project/UserName | Sep 23-29 | Sep 30-Oct 06 | Oct 07-13 |
|-------------------|-----------|---------------|-----------|
| Release 1 | 1457.08 | 1481.27 | 1385.5 |
| └Delivery 2 | 1457.08 | 1481.27 | 1385.5 |
| └└Project 1 | 91.5 | 84 | 106.8 |
| └└└Engineer 1 | 21 | 0 | 32 |
| └└└Engineer 2 | 0 | 0 | 0 |
| └└└Manager 1 | 27 | 40 | 40 |
| └└└Architect 1 | 0 | 0 | 12 |
| └└└QA 1 | 23.5 | 20 | 22.8 |
| └└└QA 2 | 20 | 24 | 0 |
| └└Project 2 | 74 | 77 | 59.5 |
| └└└Manager 2 | 32 | 33 | 28.5 |
| └└└Engineer 3 | 17 | 36 | 21 |
| └└└Engineer 4 | 25 | 8 | 10 |
| └└Project 3 | 78.5 | 91.5 | 76 |
| └└└CM 1 | 27 | 28.5 | 40 |
| └└└System Admin 2 | 15 | 32 | 30 |
| └└└DBA 3 | 36.5 | 31 | 6 |
| └Project 4 | 16 | 4 | 20 |

Hierarchical Task Hour Report

Resource Management Contd.

| Weekly Time Card | | | |
|--|---------------|------------------------|----------------|
| Saturday 10/06/2007 through Friday 10/12/2007 | | test user (testuser) | [My Time Card] |
| Task Name | Task Log Type | Log Entry | Hours |
| Saturday 10/06/2007 | | | |
| Total Hours | | | 0 |
| Sunday 10/07/2007 | | | |
| Total Hours | | | 0 |
| Monday 10/08/2007 | | | |
| Total Hours | | | 0 |
| Tuesday 10/09/2007 | | | |
| Total Hours | | | 0 |
| Wednesday 10/10/2007 | | | |
| Total Hours | | | 0 |
| Thursday 10/11/2007 | | | |
| Total Hours | | | 0 |
| Friday 10/12/2007 | | | |
| Total Hours | | | 0 |
| For the week of Saturday 10/06/2007 through Friday 10/12/2007 | | | |
| Total Hours | | | 0 |
| Status | | | |

Weekly Timesheet Report

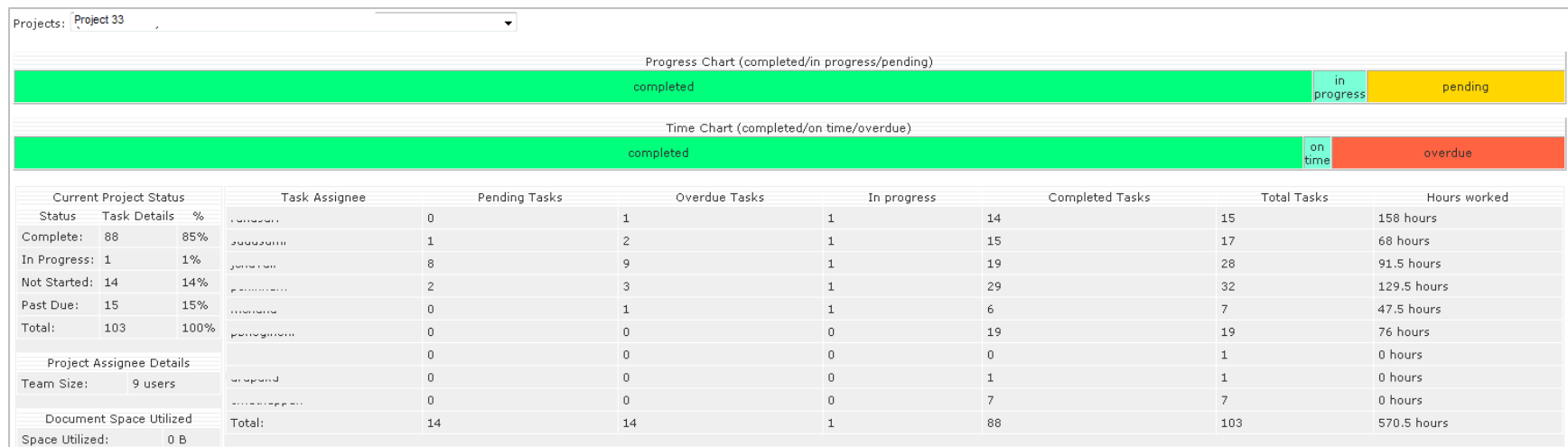
Defect Management

- Integrated with the projects and tasks in the WMS system
- Defect Tracking
 - Originating task
 - SPR number created in JIRA
 - Task is executed through phases of SDLC
- Task Performance Measurement
 - Software defects
 - Document issues
 - Meeting attendance
- Reports
 - Defect density
 - Defects per KSLOC
 - Defect statistics by origin, project, resource

Business Intelligence

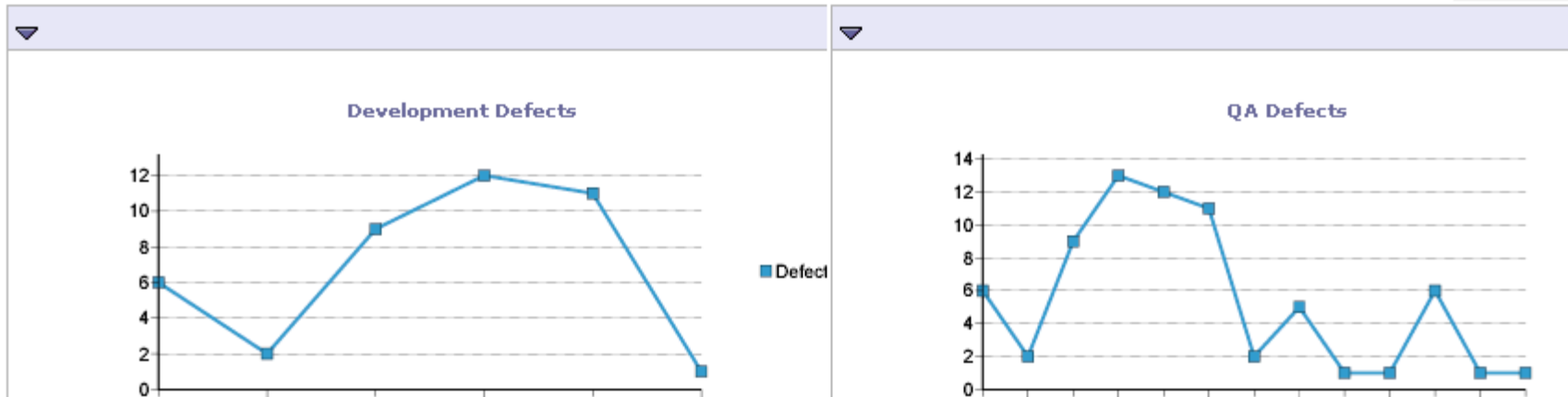
- Task Management
 - Task tracking reports
 - Task status reporting of complete, pending tasks
- Risk Management Measures
- Defect Measures
- Resource Utilization Measures

Business Intelligence Contd.



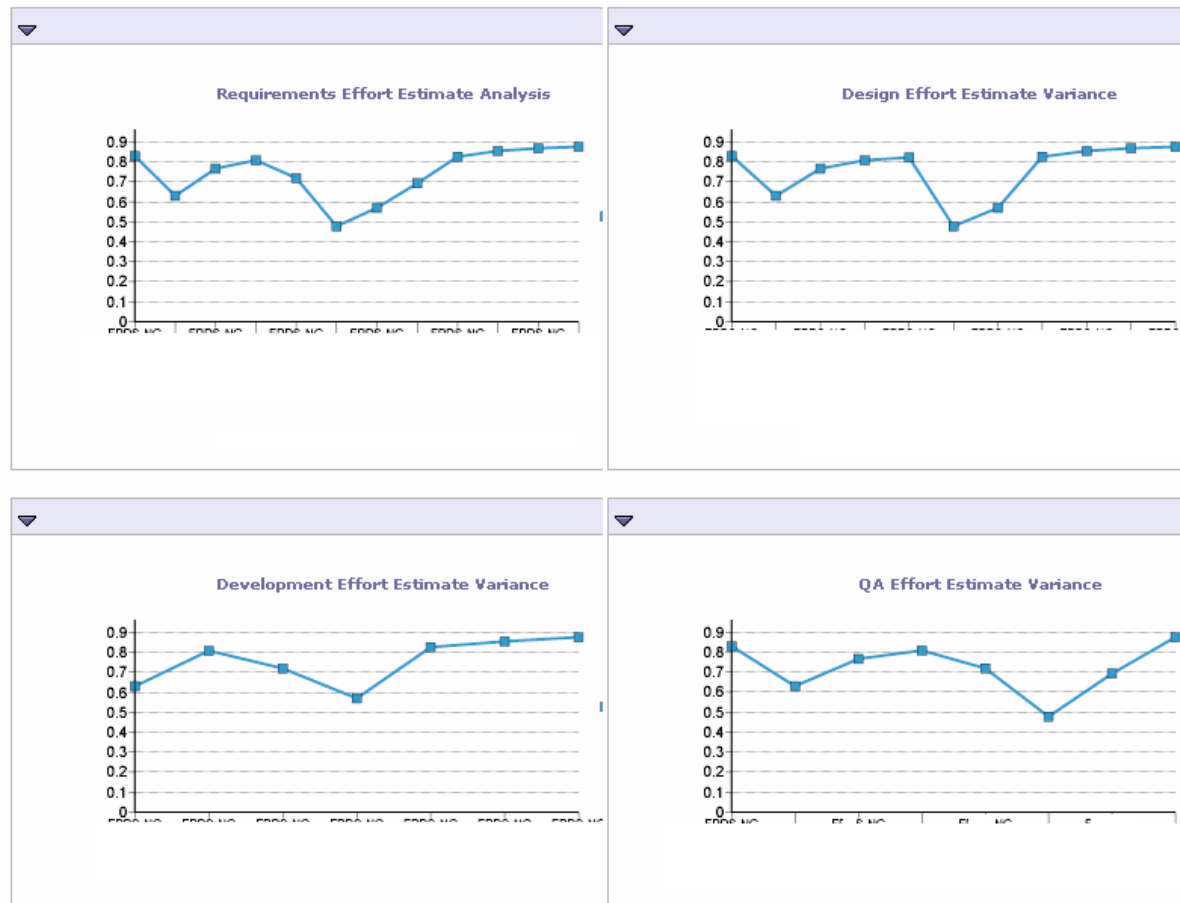
Project Statistics Dashboard

Business Intelligence Contd.



Project Defects Dashboard

Business Intelligence Contd.



Project Effort Estimate Variance Dashboard

Tying it back to CMMI

| PPM Processes | CMMI Process Areas | Maturity Level |
|--|--|----------------|
| Project Portfolio Management | Integrated Project Management (IPM) | 3 |
| Project Planning and Scheduling | Project Planning (PP) | 2 |
| Technical Performance Management | Project Monitoring and Control (PMC) | 2 |
| Earned Value Management | Integrated Project Management (IPM) | 3 |
| Risk Management | Project Monitoring and Control (PMC) | 2 |
| | Risk Management (RSKM) | 3 |
| Defect management | Validation (VAL) | 3 |
| | Verification (VER) | 3 |
| Resource Management | Project Planning (PP) | 2 |
| Business Intelligence Reports and Dashboards | Measurement and Analysis (M&A) | 3 |
| | Quantitative Project Management | 4 |
| | Organizational Process Performance (OPP) | 4 |

References

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 - OMB Circular A11, Part 7
 - http://www.whitehouse.gov/omb/circulars/a11/current_year/s300.pdf
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 - Tamara Suleiman
 - CMMI: Guidelines for Process Integration and Product Improvement, Second Edition
 - Mary Beth Chrissis, Mike Konrad, and Sandy Shrum

Summary

- Automation leading to PPM approach easily implemented by a smaller organization
- Solution for common PPM challenges across all organizations
- Automated PPM provided the foundation
 - Easier CMMI adoption
 - Level 3 Appraisal
- Intention to approach ML4 activities in a similar fashion
- Thoughts
 - Real-time introspective management vs. retrospective management
 - Emphasis on forecasting for tomorrow rather than project instances

Thank you