Object-Oriented Methodology 101

Presented by:

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• Premises
  – *OO is becoming critical as systems become more*
    » Complicated
    » Complex
    » Distributed
  – *Organizations are*
    » No longer investigating *OO as a possibility*
    » Investigating how to use *OO competitively*

• Objectives
  – *Discuss reasons/benefits of *OO*
  – *Discuss the essential linchpin to realize those benefits*
What to Expect

• Object-orientation’s first impact at your company
  – *Can be a tremendous success, or*
  – *A complete blunder*

• Need awareness of this technology's
  – *Power*
  – *Impact*
  – *Shortcomings*
  – *Potential*
Benefits of Object-Orientation

- Faster development
- Reduced cost
  - Reuse
- Higher quality systems
- Improved architecture
  - More adaptable
  - More scalable

Benefits come from careful analysis, design, and development practices that exploit the OO paradigm!
Methodology
The Quintessential Linchpin!!!
Methodology

• A specification of a process through which software can be developed

• A set of generic software development techniques together with a set of guidelines defining how and when those techniques should be applied

“Though there is madness, there is a method in’t.”

- Hamlet, William Shakespeare
What Should an OO Methodology Do?

- Define
  - Project roles
  - Software lifecycle
  - Deliverables to be created
  - Standards for documenting those deliverables
  - Techniques for creating those deliverables
  - Dependencies among deliverables

- Ensure consistent application of techniques

- Facilitate staff transitions between phases and projects

Needs to be reasonable, pragmatic, and most of all flexible
What Should an OO Methodology Do?

- Provide
  - An experience base in the following areas
    - Estimating guidelines and templates
    - Techniques for analyzing models
  - Depth of coverage for life cycle phases
  - Guidance for
    - Object-Oriented Applications
    - Distributed Object Applications
  - Quality examples

- Stress iterative and incremental development

Needs to be reasonable, pragmatic, and most of all flexible
Methodology
Misconceptions

• Notation is not methodology
  – Unified Modeling Language (UML)
  – Object Modeling Technique (OMT)
  – Booch
Methodology
Misconceptions

• Language is not methodology
  – C++
  – Smalltalk
  – Java
  – Eiffel
  – Visual Basic

• Tools are not methodology
  – Rational Rose
  – Paradigm Plus
  – Select OMT
  – GUI Builder
Tools Are Not Smart
So We Have to Be

The lazy dog jumped over the object method since the server for client partitioning was not correct.
What to Look For in a Methodology

Process
Predictability vs. Creativity

- Management needs predictability,
  - Essential for
    » Team organization and assignments
    » Incremental build plans
    » Risk mitigation
    » Proactive management

- Development team thrives on creativity
  - Essential for creation of solutions
    » Innovative
    » Unique

Problem - Need to establish a balance between these two extremes

Answer - Distinguish the macro/micro elements of the development process

Macro Development Process
Micro Development Process

* Adapted from: Grady, B., Object Solutions.
Macro Development Process

Overview

• Overall concern is planning

• Three key elements
  1. Continuous integration
  2. Executable releases that grow in functionality
  3. Releases enable management to measure progress and actively identify risks and mitigate them

• Macro process
  • Represents the project manager’s needs
  • Controlling framework for the micro process
  • Time frame measured in weeks/months

Project managers can only control things they can see
Micro Development Process

Overview

• Agenda
  1. Select the correct abstractions
  2. Determine proper distribution of responsibility
  3. Create a set of mechanisms that regulate these abstractions (e.g., semantic dependencies)
  4. Concretely represent these abstractions and mechanisms

• Micro process
  • Represents the development team’s needs
  • Carries on throughout the macro process, but each iteration has a different emphasis depending upon the project’s current macro process
  • Time frame measured in weeks/days
What Can I Expect on My First OO Project?

• Lessons Learned
  – Project management
    » Duration
    » Staffing
    » Reuse strategy
    » Project estimating
  – Analysis and design
  – Technology

• How does and OO Methodology Help?
Lessons Learned

Project Management - Duration

• First project
  – *Will take longer than using your traditional approach*
  – *Mostly learning curve*
  – *Little or no reuse*

• Second project
  – *Will take longer than using your traditional approach*
  – *Learning curve still exists for design and architecture*
  – *Maybe some reuse*

• Third project (payback)

*Duration of a project is approximately 6 months*
Lessons Learned

Project Management - Staffing

• Few skilled and experienced staff
  – Options
    » Hire an experienced staff
    » Subcontract
    » Mentor

• Strip mining vs. investment
  – “On the job learning” doesn’t work
  – Grow your experts

• Realize everyone will not be capable of making the paradigm shift to OO
Lessons Learned

Project Management - Reuse Strategy

• Incorrect belief that reuse is guaranteed because we are object-oriented
  – Must plan for reuse
  – Takes time and money

• Need
  – Specific procedures
  – Dedicated resources
  – Investment in re-use

• Diligently select candidate classes to make reusable
  – Every class does not have to be reusable
  – More reuse is not always better
  – Examine cost/benefit trade-offs
Lessons Learned

Project Management - Estimating

• Original estimates were based upon “Classic” development approach

• Few object technology projects as models
  – Had to learn by experience
  – Rework necessary but valuable

• Project plans need to include time for
  – Prototypes and evaluations
  – Walk-throughs and inspections
Lessons Learned

Analysis and Design - 1

- Be aware of creating “object-free” applications
  - *Seduction by the “dark side” of OO*

- Empower a chief architect or architecture team

- Illusion of rapid progress during development
  - *Essentially the “Universal Studio© Effect”*

- Do not underestimate analysis and design
  - *Need*
  - *Difficulty*
Lessons Learned
Analysis and Design - 2*

* Source: Gartner Group

Development Life Cycle

Percentage of Development Effort

Analysis/Design  Coding/Unit Testing  Integration, System and Acceptance Testing

Pre-Objects  With Objects
Lessons Learned
Technology - Maturity?

• Individual technologies have matured but new technologies continue to develop and gain mindshare
  – For example,
    » Internet/intranet applications
    » Object Request Brokers (ORBs)
    » Object-oriented databases

• Major risk - vendors failed to deliver products on time

• Software Development Environment
  – Must be managed
  – Upgrades frequent
  – Upgrades not 100% compatible with earlier versions
In Summary

Five Guidelines for Success

1. Organization must understand their problem
2. Upper management commitment
   - Stand by the project
   - Accurate expectations
3. Select/implement a methodology
4. Effective education/mentoring
   - Multiple levels of education
   - Front-end lifecycle education
     » Requirements
     » Analysis
     » Design
   - Language education
   - Testing
5. Select a pilot project and set accurate expectations

Must be able to answer the question - “Why are we transitioning to OO?”
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