Distributed Team Building

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About the Author

- Principal Architect
  PROGRESS - Open Source Center of Competence
- Degree in Computer Science from the University of the German Forces 1992
- Working with middleware like MOMs, CORBA, J2EE, WS and ESBs ever since for Sterling Software, Iona Technologies and PROGRESS
- Specialized on ESB based architectures since 2002

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About FUSE

- The examples are based on the FUSE releases of Apache ServiceMix and Apache ActiveMQ
- The FUSE community provides
  - **Access to Committers** as many Apache commiters are employed by the FUSE team
  - **Enterprise support** – Open source adaption in the enterprise requires 24x7 reliable support
  - **Increased testing** on a CI environment maintained by the FUSE team
  - **Enterprise qualities of service** – Ensuring sensible Enterprise deployment and backwards compatibility
  - **Documentation and training** for the Apache projects released under the FUSE brand
  - **Backed by large, enterprise company**

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FUSE products

- FUSE ESB 3
  Based on Apache Service Mix 3
- FUSE ESB 4
  Based on Apache Service Mix 4
- FUSE Message Broker
  Based on Apache ActiveMQ
- FUSE Services Framework
  Based on Apache CXF
- FUSE Mediation Router
  Based on Apache Camel
- FUSE Integration Designer
  Eclipse tooling for implementing EIP flows
- FUSE HQ
  Management and Monitoring of the FUSE infrastructure

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Agenda

- A closer look at SOA applications
- Platform components
- Tools enforcing project standards
- Project Lifecycle
- Conclusion

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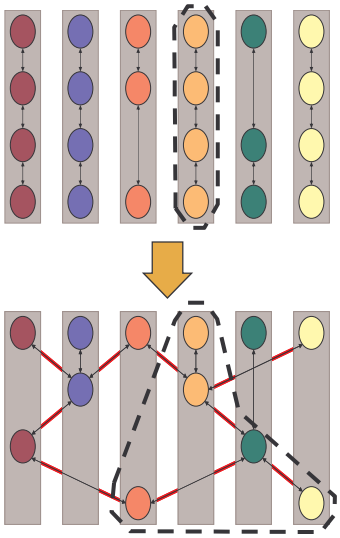
Impacts of SOA on development



Silos (with only data integration)

- Each business process is self-contained in a single silo
  - One team has end-to-end responsibility
  - Infrastructure easily mapped to business
  - Policies can apply to the silo only
    - Security, compliance, visibility, etc.
  - App decisions have local impact only
    - Middleware, data formats, standards, etc.

SOA / Shared Services

- Business processes span "silos"
  - ⚠ No one team has end-to-end responsibility or visibility
  - ⚠ Business processes have no direct mapping to silos
    - The same service may serve multiple different business processes
  - ⚠ Policies need to apply to entire process
  - ⚠ App decisions have global impact

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Definitions: Business application

- A Business application is a collection of modules that solves a given business problem.
- It is:
  - Versioned
  - Documented
  - Tailorable to different runtime environments
  - Specified in terms of business requirements
- A Business application is composed of **Services**
- Examples:
  - Equity Management in Finance
  - Service Provisioning in TelCo
  - Complaint Management in Pharma

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Definitions: Service

- A **Service** has a well defined interface and encapsulates a piece of application logic or hides the complexity of a technology used
- It is:
  - Versioned
  - Documented
  - Tailorable to different runtime environments
  - Well specified in terms of interfaces
  - Free of any side effects
- A Service may be stand-alone or be composed of other services
- Examples
  - Sonic ESB® Services
  - Sonic ESB Generic Processes
  - Backend Adapter
  - Customer Database access logic

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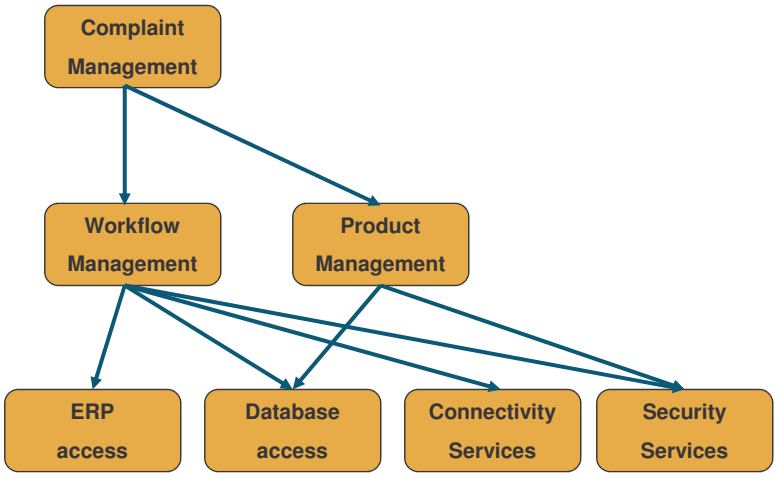
An Example



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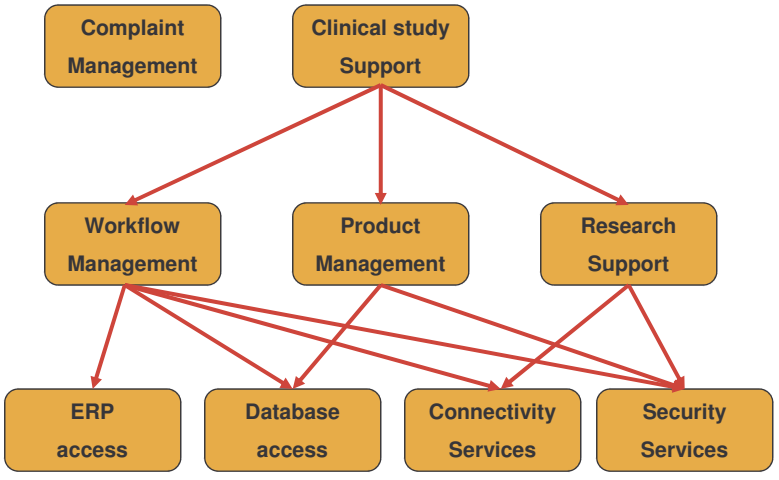

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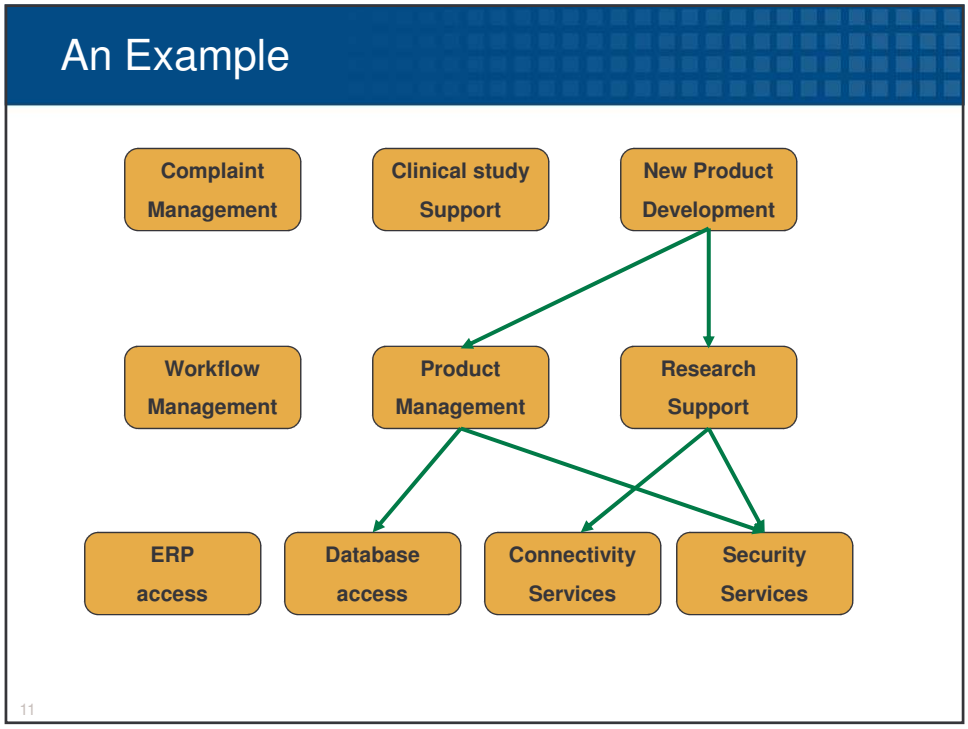
An Example
Complaint Management
Clinical study Support
New Product Development
Workflow Management
Product Management
Research Support
ERP access
Database access
Connectivity Services
Security Services
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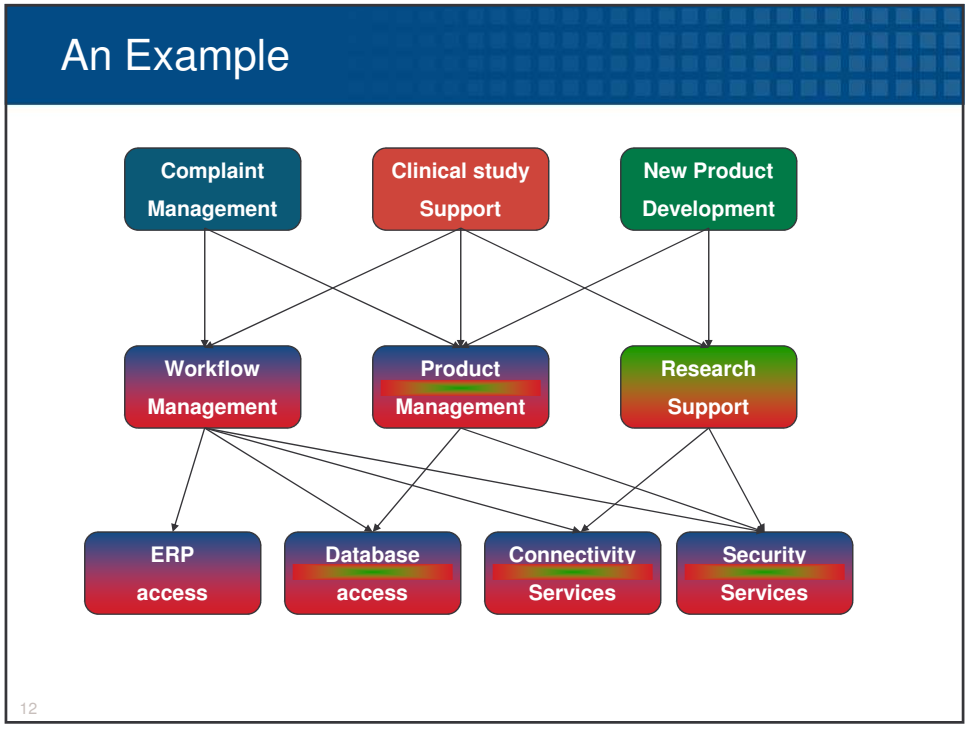
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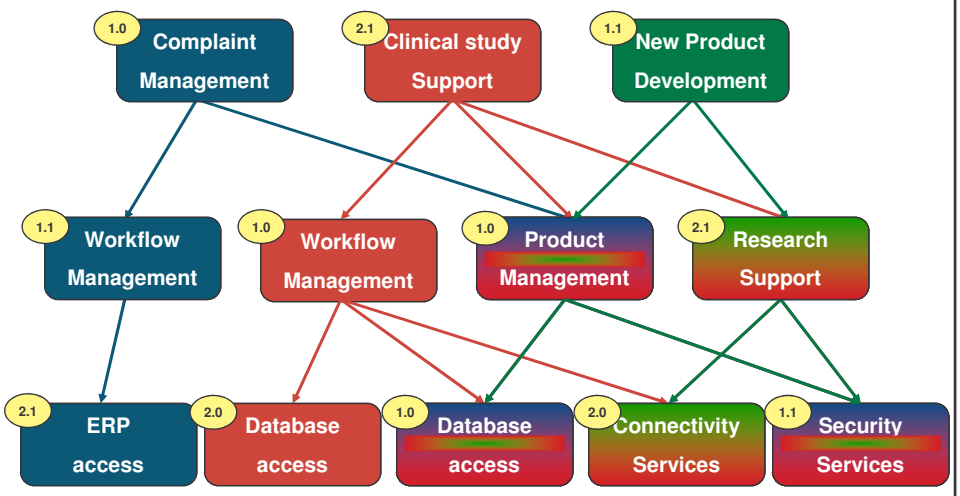
Adding versioning to the challenge



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Team challenges in SOA applications

- Requirements change very fast
- Multiple development teams may exist due to acquisitions or mergers
- Language barriers as teams might be multinational
- Knowledge distribution – not all team members on the same skill level
- Missing trust in each others competences
- Increased overhead handing over components into QA or production

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Addressing the challenges

- A well defined and distributed development process needs to be established
  - Use a well defined set of tools
  - Define project standards that make the teams life easier rather than hardee
- Encourage regular interaction as early as possible
  - Virtual team meetings (IRC, Webmeetings etc.)
  - Knowledge sharing platforms
- Encourage collaboration rather than competition
- Take different mentalities into account
- Make everyone in the team know his/her function

- A proper development platform can address the technical aspects of a distributed team

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Requirements development platform

- Services shall be reusable in different business applications
- The developers should be focused on developing their service(s)
- Unit Testing, Integration testing must be part of the development cycle
- Knowledge sharing must be inherent to the proposed solution
- Dependency management must be integral part of the solution
- The packaging process must resolve versioned dependencies.
- The software packages shall be built and tested regularly and automatically using a continuous integration server

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Continuous Integration

- **Continuous integration** aims to speed up the software delivery by decreasing integration times
- A **code repository** allows multiple developers to work on the same project
- **Build automation** reduces the time to build the software for testing purposes
- **Test automation** allows tests to be run as part of the build process for immediate feedback
- **Automated deployment** enables the staging of the software in Test-, Integration- and Production environments

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A Continuous Integration platform for SOA

- A CIP provides a version control and dependency management facility for the services
- It also supports build, test and integration automation
- It gives the developer immediate feedback about any issues encountered due to module dependencies
- It provides an automated packaging and distribution mechanism for binaries and documentation

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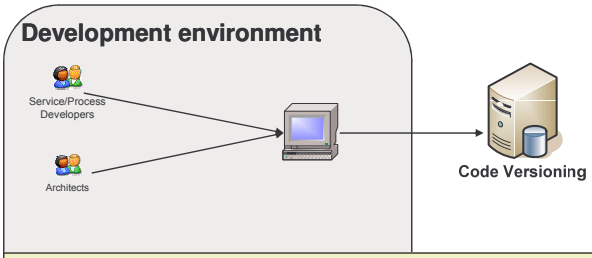
Continuous Integration Platform: Developer



- **The developers and architects work with their usual environment.**
- **Version Control is essential for working in teams.**
- **Unit tests are a mandatory deliverable for each service.**
- **The test framework is usually integrated in the workbench.**
- **Each service must support a headless build.**

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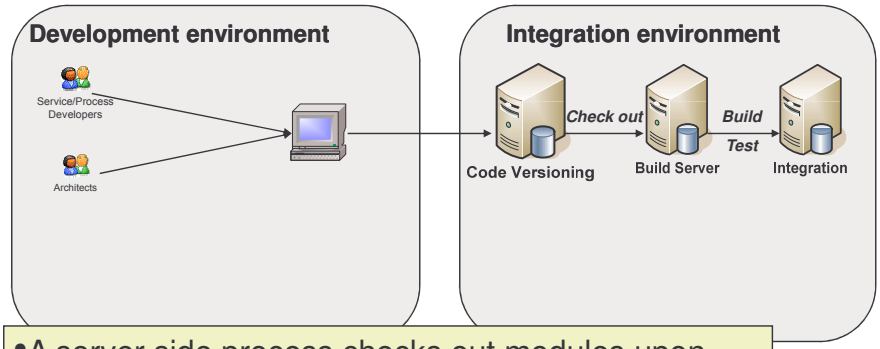
Continuous Integration Platform: Build Server



- A server side process checks out modules upon modification and validates dependencies.
- The changed modules are rebuilt and retested using the unit and integration test specifications.

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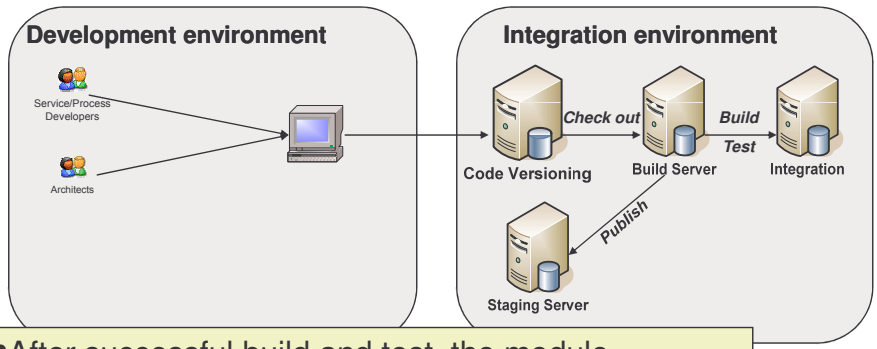
Continuous Integration Platform: Staging



- After successful build and test, the module documentation is published automatically.
- After successful build and test, the module package is published via a module repository.

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Continuous Integration Platform: QA

- QA can check-out published modules to test
  - Deployment
  - Performance
  - Functionality (in addition to automated tests)
  - Documentation (as published on the Web Server)
  - Problems are handled via the Problem Management process

QA environment

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Continuous Integration Platform: Production

Development environment

Integration environment

- Release Management can download tested modules and perform the release according to the release procedure
  - Burn the „Golden image“
  - Deploy the application into the productive environment

QA environment

Production environment

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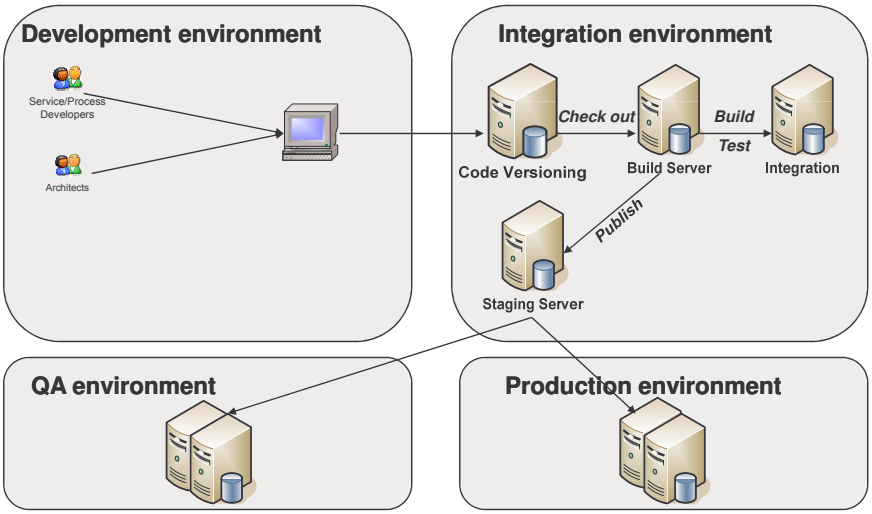
Continuous Integration Platform: Production



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Does a build platform address the problems

- The platform allows all team members o work on any component independently of their location
- Test, documentation and development teams work collaboratively on the same artifacts
- Test results, documentation, source code and development metrics are available after each automated build
- Automated build process requires project standards to be set
- A defined project life cycle is required and must be communicated to all team members

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Project Structuring

http://maven.apache.org/

- Common project elements and build rules in a common master model
  - Version control location
  - Web page location
  - Project infrastructure
- Loosely coupled projects with up-to-date dependencies
  - Repository based build platform
  - Distributed repositories possible

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Version Control

http://subversion.tigris.org/

- Open Source Version Control System
- Allows also versioning of directories (as opposed to CVS)
- Server available on Windows / Unix platforms
  - Leverages WebDAV protocol provided by Apache to enforce SSL and authentication
- Many clients available
  - Eclipse, Windows Explorer (Tortoise), WinSVN, command line, ANT, Maven etc.

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Continuous Build component

http://continuum.apache.org

- Rebuilds and Retests registered projects upon committed changes
- Updates the Snapshot repository
- Rebuilds and Re-deploys the Project Web page
- Rebuilds and Retests project dependencies
- Notifies developers upon build errors to take corrective action

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Documentation Elements

- Project related documentation in Maven format (apt, xdoc, …)
  - Apt is very easy for developers
- Javadoc
- Maven project reports
  - Test report
  - Checkstyle report
  - Test coverage report
  - Source reference

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QA elements (1)

http://checkstyle.sourceforge.net/

- Checkstyle rules integrated in Maven 2
- Checkstyle violations reported in standard project documentation
  - Should be addressed in code maintenance
- Makes code exchangeable across team members
- Enforces Javadoc documentation
- Checkstyle checker available as Eclipse Plug-in

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QA elements (2)

http://www.junit.org/index.htm

- Open Source Test Framework for Java™
  - De Facto Standard for Java Testing
- Supported in Eclipse
- Automatically executed by Maven 2
- Generated Test report on Project Web Page
- Test Coverage analysis in Maven 2 by cobertura (http://cobertura.sourceforge.net/)

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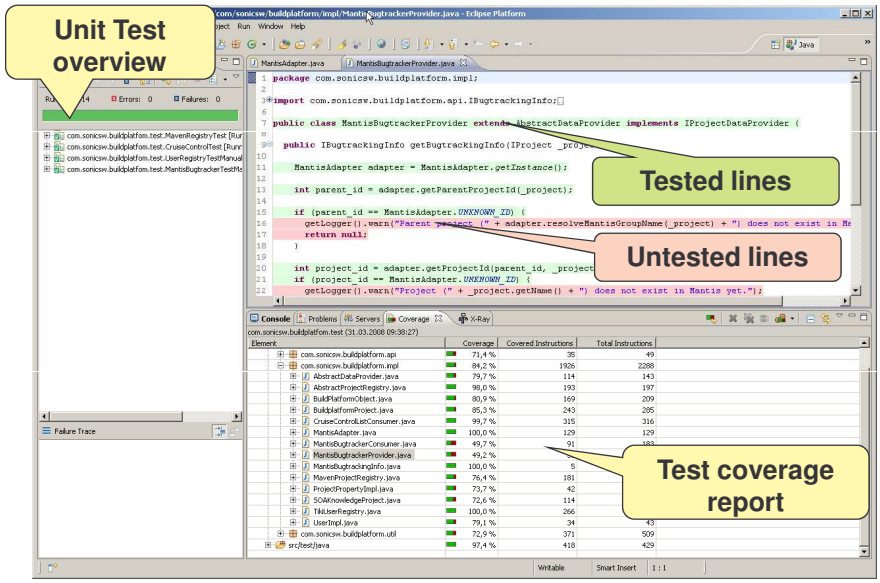
QA integrated into development



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Project Lifecycle

Development Phase

- Producing
  - Code artifacts including documentation
  - Unit test cases
  - Additional documentation
- Committing
  - Regularly to update Snapshot builds (Share early, Share often)
- Feature Driven
  - Working towards feature completeness before moving to RC1

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Project Lifecycle

Review Phase (RC1)

- Ideally done by different person
  - Using the tagging mechanism to tag RC1
  - Review & Amend documentation (completeness, quality)
  - Review & Amend test cases (test coverage, execution)
- Commit / Merge changes back to Snapshot branch

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Project Lifecycle

Release

- Use the tagging mechanism to tag final release
- Rebuild the new release and populate download page with release
- Publish Release Web Page
- Remove Release Version from Continuous build

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Conclusion

- As SOA moves into practice, a build management system is essential to reliably build reliable Business Applications.
- A properly configured build management system must go hand-in-hand with the developer‘s mind set.
- The build management should impact the single developer only to a minimal degree in terms of effort and to a maximum degree in terms of benefits.
- Reusing versioned components is virtually impossible without a build management system.
- Reusing components grants the ROI for introducing a build management system.
- Built-In communication and sharing minimizes fear and distrust in distributed teams
- Virtual team meetings can be held using the information on the CIP

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Conclusion ctd.

- Reuse of components due to the repository management of the build platform
- Better tested software due to module reusage and more test cases for more scenarios.
- Increased speed of development by standardized view of individual projects.
- Automated deployment into Q&A environments are achievable due to standardization

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Questions ?

Come and talk to us at http://fusesource.com/forums/index.jspa

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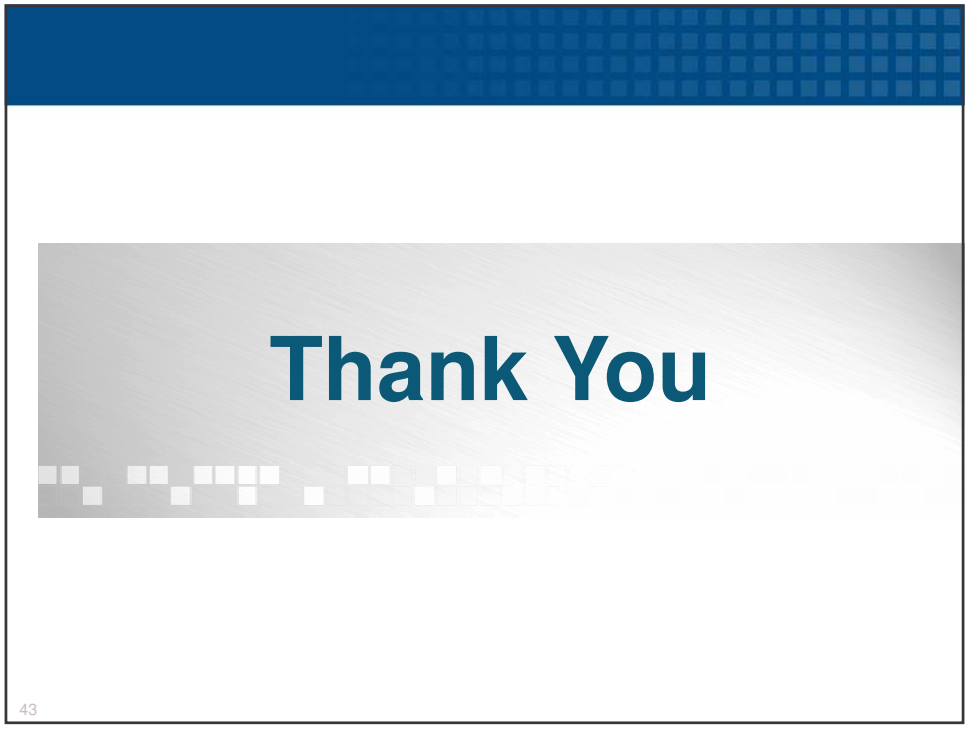
Thank You
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