

Business & Enterprise Systems

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BES Technical Exchange Forum

12 Feb 2013



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Ideas Matter



- **Ideas MATTER**
 - **If we trade an apple, we're each left with one apple each**
 - **When we trade an idea, we both leave with two ideas**
- **This discussion will cover a range of technical topics. The Govt is exploring the technical feasibility and applicability of various software engineering practices to the Business Enterprise Systems portfolio. This discussion is not prelude to any specific requirement; but the information shared may shape official requirements in the future.**
- **Thank you for your participation in this market research event!**



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Goals Matter



"Would you tell me, please, which way I ought to go from here?"

"That depends a good deal on where you want to get to," said the Cat.

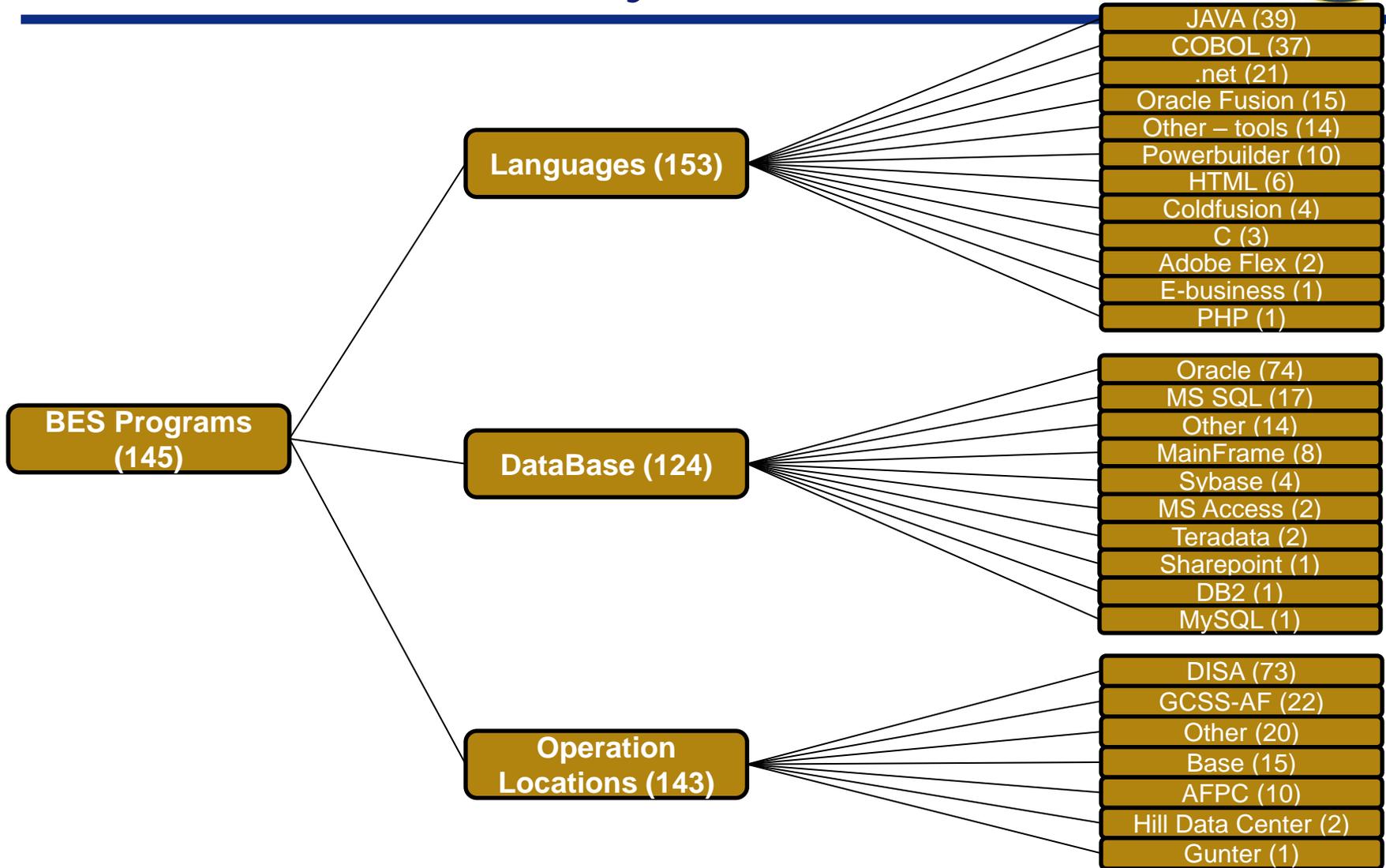
"I don't much care where—" said Alice.

"Then it doesn't matter which way you go," said the Cat.

■ **Source: Alice's Adventures in Wonderland BY LEWIS CARROLL**

Which Way?

Diversity in the BES Portfolio





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How Did This Happen?



- **Acquisition strategy and reforms**
 - **Relax/eliminate restrictive Government standards**
 - **Accept commercial standards; “Best Practice”**
 - **Reduce time to delivery**
- **Natural evolution of Info Technology**
 - **Mainframe**
 - **PC: DIY reports**
 - **Client-server**
 - **Language development: 4GL, Java, .NET**
 - **Rapid pace**

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What the *BES Technical Community* Knows



- Phillip LaPlante: *What Every Engineer should know about Software Engineering*, CRC Press.
 - “A software process....provides for a common software development framework both within a project and across projects. ***The process allows for productivity improvements and it provides for a common culture, a common language, and common skills among organizational members.*** These benefits foster a high level of traceability and efficient communication throughout the project. In fact, ***it is very difficult*** to apply correct project management principles ***when*** an appropriate ***process model is not in place.*** [Emphasis added by speaker]



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Why We're Here



■ PROBLEM STATEMENT:

- The Air Force has made significant investments in information technology, both hardware and software, over the last twenty years. These expenditures were made in a climate where (a) an overarching DoD/AF acquisition strategy gave preference to commercial best practices over govt-specified standards; and (b) the pace of technology evolution was faster than the USAF could buy and implement the latest "new thing".
- This combination has resulted in a portfolio of business IT applications with a very wide range of technologies to be sustained--from mainframes to the latest new-fangled web application framework, with a plethora of programming languages (Java, C#, C, Pactice, Cobol, etc.) and databases.
- The USAF now faces a mission dependency on dozens of contract software development teams and commercial software OEMs, each with proprietary practices for recruiting, developing, and training the people who write the software that enables AF mission accomplishment.
- The challenge for PEO Business Enterprise Systems is to balance the benefits of IT solution diversity against the cost to sustain an ever-increasing gamut of dated "best practice" solutions in the AF IT inventory.
- PEO BES needs inputs from the dozens of IT software development service providers on the merits of establishing a limited number of software development frameworks for use in sustaining a portfolio of over 100+ IT capabilities while adhering to the principles of full and open competition and controlled technology insertion.

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Diversity/Standardization in a Competitive Acquisition Context



- **Diversity: Embrace rapid emergence of IT solutions**
 - **Pros**
 - **Cons**
- **Standardization: Control variation across the enterprise**
 - **Pros**
 - **Cons**
- **Acquisition Context**
 - **Fixed Price vs. Cost, LPTA, Reverse Auction**
 - **Emerging AF Governance**
 - **PEO C3I&N: Acquire infrastructure HW/SW/Network**
 - **MCO: Acquire/develop mission applications**
 - **PEO BES, PEO BM, and others**



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BES Market Research

Software Development Practices



- **Good sites for sharing ideas about development best practices**
 - <http://www.dzone.com>
 - <http://www.infoq.com>
- **Observations**
 - **Most heavily-used web properties seem to rely more and more on open source tech stacks**
 - **Site owners seem to rarely outsource the development and maintenance of these mission critical properties**
 - **Emerging importance of Javascript in delivering responsive, rich user experience in the browser**
 - <http://www.infoq.com/research/top-javascript-mvc-frameworks>



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InfoQ Survey: .NET Tools and Practices

Source: http://www.infoq.com/news/2012/12/dotnet-research-insights?utm_source=infoq&utm_medium=related_content_link&utm_campaign=relatedContent_research_clk



“...community-driven research initiative, we are examining the adoption level of a range of practices and tools that aim to assist .NET developers in these practices. ...

These practices are:

Behavior-driven development (BDD) specifies that tests of any unit of software should be specified in terms of the desired behavior of the unit.

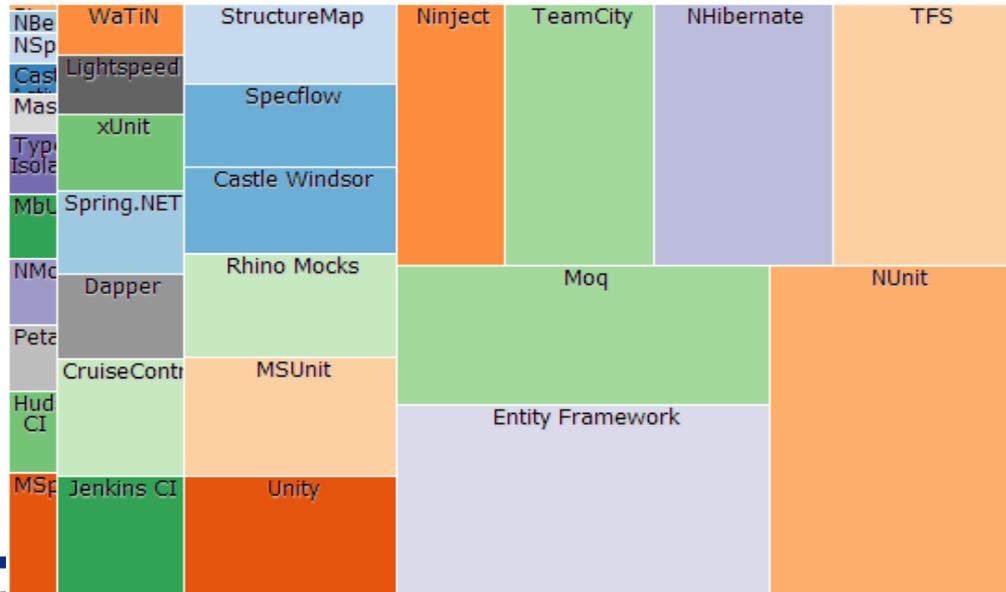
Unit Testing/TDD is a method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine if they are fit for use.

Object-relational mapping (ORM) converts data between the strongly typed .NET objects and the relational database schema.

Dependency Injection (DI) is a technique used to cleanly divide code into separate units and then wiring them up at runtime.

Continuous Integration is the practice of frequently integrating one's new or changed code with the existing code repository – should occur frequently enough that no intervening window remains between commit and build, and such that no errors can arise without developers noticing them and correcting them immediately.”

600 Respondents





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InfoQ Survey: .NET Tools and Practices

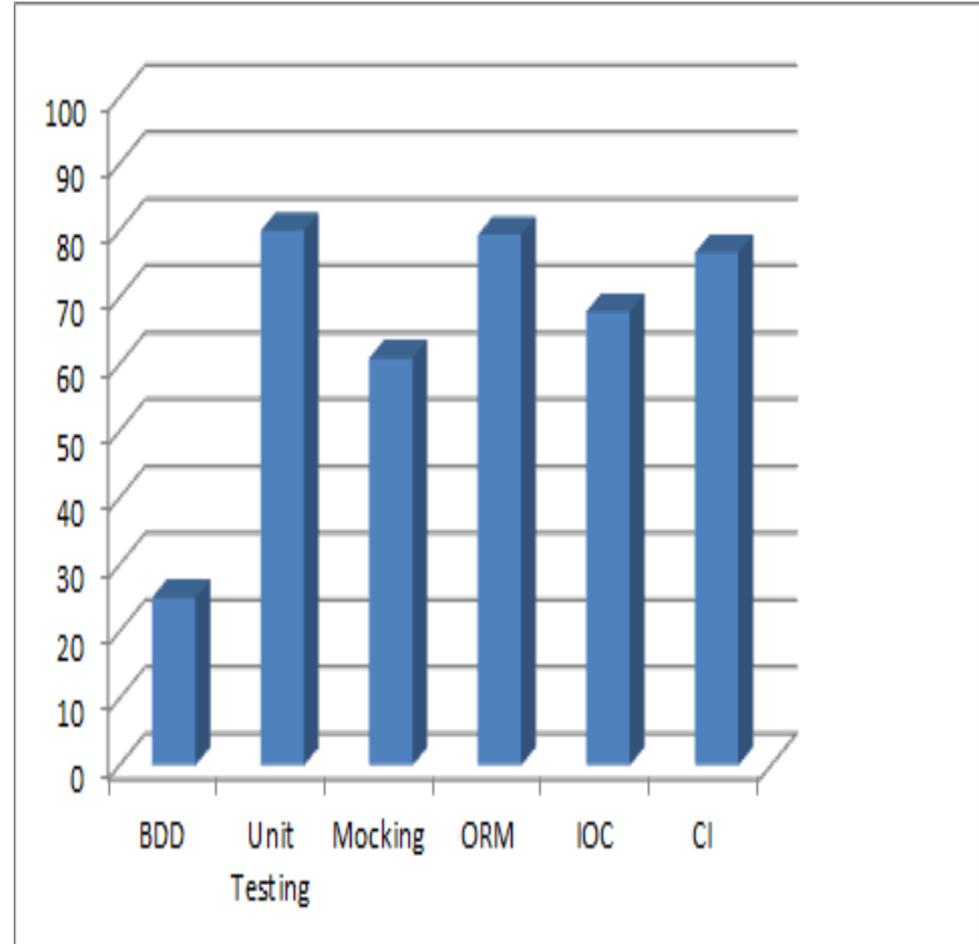
Source: http://www.infoq.com/news/2012/12/dotnet-research-insights?utm_source=infoq&utm_medium=related_content_link&utm_campaign=relatedContent_research_clk



“Interesting Highlights -

- 80% of the respondents practice unit testing – 78% of those use NUnit for their unit testing needs
- Out of those who practice unit testing, roughly 75% (60% of the overall respondents) use some or the other mocking framework. Moq is the most popular choice with a usage share of 70%
- 25% of respondents use BDD tools – out of this, 60% use Specflow
- 67% of respondents use an IoC container amongst the one we listed – usage is fairly distributed amongst various choices (Ninject led by a small margin), with several respondents having used more than one framework
- 80% of the respondents use some or the other ORM with at least one fourth of these using more than one – the most commonly used ORMs are Entity Framework followed by NHibernate
- 76% of respondents used tools that enable Continuous integration – TFS leads here with 48% (although it is possible to use TFS without CI as well). The pure-CI tool that leads usage is TeamCity.

For the overall practices, the usage graph looks like so, with y-axis corresponding to percentage of respondents using at least one of the tools that enable the corresponding practice”





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BES Survey



- **References: Gartner Analyst calls, InfoQ.com survey, Wikipedia**
- **Identified a list of programming frameworks, development tools and practices**
- **Survey request to identify any frameworks, tools, and practices employed in the support of two categories of work:**
 - **Industry Partners with contracts supporting a BES application**
 - **Industry Partners with projects supporting non-BES applications, where project initiated in the last year (CY2012)**
- **Findings:**
 - **Poor response volume overall**
 - **Inconclusive, but with signs that previous RFP requirements has a hint of commonality in certain tooling aspects**



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Survey Results

Frameworks Reported



JAVA	Apache Click	Apache Struts	Eclipse RAP	JavaServer Faces
	Apache Struts 2	multiple frameworks based on node.js	ExtJS (JavaScript framework)	Oracle ADF

.NET	ASP.NET MVC Framework (ASP.NET MVC)	DotNetNuke
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Survey Results

Dev Methodologies and IDEs Reported



Development Methodologies	Waterfall	Agile	Incremental	Iterative	Scrum
	RAD	SEP	Prototype Model	CMMI	Extreme

IDE	JDeveloper	Microsoft Visual Studio	Eclipse JDT	Oracle SQLDeveloper (SQL)	SQL Server Mgmt Studio	NetBeans
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Survey Results

Dev Tools Reported



Configuration Management	PVCS	Clearcase	CVS	IBM CMVC	Subversion	SourceAnywhere	
Testing Tools	HP QuickTest Professional	HP Quality Center	HP WinRunner	IBM Rational Functional Tester	Ranorex	Jenkins	
Issue Tracking	HP Quality Center	Remedy Action Request System	IBM Rational ClearQuest	IBM Rational Team Concert	Bugzilla	JIRA	Serena Merant Tracker



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Survey Results

Requirement Mgt and Cost Estimating Tools Reported



Requirements / Lifecycle Management	HP Quality Center	Serena Software	Microsoft	IBM - Collaborative Lifecycle Management	IBM's ReqPro
Cost Estimation	Use Case Analysis	Project Management Software	Average of an analogy-based and a Work breakdown structure-based effort estimate	Expert judgment based on estimates from a parametric model	Function Point Analysis



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Brainstorming Session

***How best to shape the technical aspects
of the BES portfolio evolution?***



- **RFP Mandates**
- **Centralized Design Services**
- **BES “Open Source” Consortium**
- **“DoD Waterfall” vs Agile**
- **Others?**

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Brainstorming RFP Mandates



- What if future RFPs mandate the use of certain frameworks in sustaining BES applications?
- Please help us identify the top pros and cons to such a mandate in a RFP
 - PROs
 - CONs



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Brainstorming Centralized Design Services



- **What if NC-2 was used to compete for Centralized Design responsibility over all applications sharing a given technology, i.e., all Java apps? This Chief Designer authors P-Specs and unit test requirements that are subsequently competed via NC-2 for programming services. The Chief Designer provides design continuity and integration services across that subsection of the portfolio**
- **PROs**
- **CONs**



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Brainstorming

BES Open Source Consortium



- What if Govt and Industry developers collaborate to develop a BES “open-source” reference application against a technology stack (e.g., Java) using peer-reviewed source code? Goal is to maximize reuse of common solutions and patterns—every application uses a common security library, a common solution to digital signature, a common presentation standard (CSS), etc.
- PROs
- CONs



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Brainstorming **“DoD Waterfall” vs Agile**



- **DoD Acquisition Policy – characterized by planning, documents/CDRLs, and periodic progress reviews**
- **Agile – Code over documentation, user stories/involvement, time-boxed, etc.**
- **Given DoD policy, how do we best reconcile/implement technical reviews against emerging Agile practices?**
 - **Requirements Review**
 - **Design Review**
 - **Preliminary**
 - **Critical**
 - **Test Readiness Review**
 - **Fielding/Deployment Readiness Review**



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Brainstorming Other Ideas?



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Summary



- **Review any homework assignments**
 - **Information exchanges needed to further the dialogue**
 - **Survey**
 - **Other data calls**
- **Assess today's session**
 - **Was it worthwhile?**
 - **Should we continue? If so, at what frequency?**
 - **Can/should we broaden the audience? If so, how**
- **Thanks for your continued support to BES Portfolio Execution!**

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Backup



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