Test Automation Center of Excellence
+
One Slide on Information Assurance

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Mr. Todd G. Fisher, Staff Assistant
Agenda

• Background
• Test Automation Center of Excellence
• DLA Test Automation
• milCloud the Intermediary

• Two Questions on Information Assurance
Background

DOT&E Driving Changes in Acquisition Policy

Beginning at Milestone A, program managers for software in any system will identify an approach to software test automation, including when key test automation software components or services will be acquired, disposition in the RFP of vendor-produced test scripts, and how decisions on level of automation will be made. The test automation approach will be updated in subsequent TEMPs as appropriate.

For software in any system, suitability at IOT&E will include a demonstrated software maintenance capability. Program managers must sustain an operationally realistic developmental test environment in which software patches can be developed and upgrades of all kinds (developed or commercial) can be tested...

DOT&E is Driving Changes in Acquisition Policy to Affect Mature Software Maintenance Capabilities
TACE Goals

• Test Automation Center of Excellence (TACE)
  – Help existing programs meet software maintenance suitability with automation

• Near Term
  – Convert coherent set of existing programs to automation
  – Develop government field engineering talent for future efforts
    • Train personnel within the converted programs on use of automation
    • Document lessons learned during conversions
    • Determine expected (should) costs and return on investment
  – Provide avenue for industry best practices and advice (ICOTE)

• By 2017
  – Lessons learned and industry partnerships formed
  – Cadre of talented, veteran field engineers who have assisted the programs
  – Set of current OT&E oversight programs converted to automation
    • Logistics and accounting programs implemented using SAP
    • Approaching IOT&E by 2017
  – Business model enabling new coherent program sets to convert to automation
  – Test as a service (TaaS) environment sustained for these programs by DISA
DLA Test Automation

- **Aug, 2010**: DLA CTO (Bill Tinston) tasks HL Barner with pursuit of test automation
- **Jan, 2011**: DLA receives Gartner report on automation products. Initiates product demonstrations and work with JITC
- **Oct, 2011**: DOT&E recommends automated testing for EProcurement (a DLA program); begins working with Barner; receives copies of 200 manual test scripts for EProcurement
- **Jan, 2012**: JITC team begins automating a complex script using HP Quality Center; experiences DLA firewall and SAP/HPQC integration problems
- **May, 2012**: JITC demonstrates automated script gives 3x improvement (1 person 3 minutes vice 3 people 9 minutes); recommends $1M follow-on study using SAP consultants
- **June, 2012**: Eprocurement IOT&E report recommends continuing work on test automation and penetration test for fraud/theft
- **July, 2012**: DLA CTO accepts $475k work proposal from Forge.mil
- **Sept, 2012**: Funds delivered
- **Jan, 2013**: milCloud able to deliver test services through DLA firewall
- **Apr, 2013**: milCloud able to work with DLA users on script development
- **May, 2013**: 5 scripts develop; user handoff begins

17 months to get started

7 months to find a good contractor

3 months moving money

4 months connecting computers

4 months connecting people

So that 1 good developer can do the work we need
milCloud is the Intermediary

milCloud GOTS at Hanscom AFB

PKI CAC Authentication

User Interface and Reporting

PKI Software Certification

Virtual Desktop

Mediates use of test tools interactively, fire-and-forget, or automatically.

- Virtual machine checks out a license at run-time
  - Number of licenses is reduced: simultaneous users vice total user population
- Reports can be constructed by milCloud
  - Expands past templates provided in test tool
  - Allows single test runs and test reports to contain multiple tests in multiple test tools
- Users can focus on testing software, not on the test environment
  - Log in from anywhere, aggregate more resource (compute, test tools), run any available test
  - Can ignore differences in the three DLA test environments

6/26/2013
Information Assurance

• DOT&E recommends fraud/theft penetration testing for financial systems
• Dr. Streilein has integrated this with IA policy and Comptroller audits
  – Comptroller audit functions as initial “blue team” scan
  – Penetration testing by red team after obvious vulnerabilities addressed
  – Fraud/theft are simply the exploit pertinent to the type of system being penetrated
• First test revealed ~1800 users who could individually commit fraud (violations of segregation of duties)... but these were also vulnerabilities for theft
• So... Did fraud or theft actually occur?
• The program needs to data mine transactions for suspicious activity
• Questions for DOT&E and ICOTE:
  – Why wouldn’t we do the same thing for other IA vulnerabilities discovered in operational systems?
  – How can we know that data mining was performed correctly without reviewing it?
Backup Slides
## Example – Manual Regression Test

<table>
<thead>
<tr>
<th>Execution Step Number</th>
<th>Owning Capacity</th>
<th>Execution Step</th>
<th>RICE Object/Script Number</th>
<th>Expected Results</th>
<th>Execution Data Used</th>
<th>Actual Results</th>
<th>Screen Shot</th>
<th>Addr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Finance</td>
<td>Enter 1-code FB03 and enter new QRT criteria 6269107665</td>
<td>QRT criteria used; Document # old #19600954097 &amp; new # 6269107665</td>
<td>QRT criteria used; Document # old # 6209107005 New Year: 2011 Company Code = ULA1 Fiscal Year = 2011</td>
<td>QRT criteria used; New Document # 6269107665 Document Display Overview - Results attached to Defect 305245 Verified 12/05/2012</td>
<td>QRT criteria used; New Document # 6209107005 New Year: 2011 Company Code = ULA1 Fiscal Year = 2011</td>
<td>![Screen Shot]</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Order Fulfillment</td>
<td>Enter 1-code VA03 Enter 2188558230 Into Order Number field Hit Enter. New Sales order used 285100088</td>
<td>VA03</td>
<td>Sales Order 2188558230 is displayed as in attached screen shot. New Sales order used 285100088</td>
<td>Sales Order 2188558230 New Sales order used 285100088</td>
<td>Sales Order 2188558230 Display Post Post Overview displayed; refer to attached screen shot Results attached to Defect 305245 Verified 12/05/2012 New Sales order used 285100088</td>
<td>![Screen Shot]</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Procurement</td>
<td>Enter 1-code ME23N Click on the &quot;Other Purchase Order&quot; icon. Select &quot;Purchase Requisition&quot; radio button. Enter 15387599 into the Purchase Requisition field. Hit Enter.</td>
<td>ME23N</td>
<td>Purchase Requisition 15387599 is displayed as in attached screen shot</td>
<td>Display Purchase Requisition 15387599</td>
<td>Displayed Purchase Requisition 15387599 refer to attached screen shot Results attached to Defect 305245 Verified 12/05/2012</td>
<td>![Screen Shot]</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Tech Quality</td>
<td>Enter 1-code MM02 Enter 000072571 into the Material Number field Hit Enter.</td>
<td>MM02</td>
<td>Material Number 000072571 is displayed as in attached screen shot (above)</td>
<td>Material Number 000072571</td>
<td>Material Number 000072571 Change Material refer to attached screen shot Results attached to Defect 305245 Verified 12/05/2012</td>
<td>![Screen Shot]</td>
<td></td>
</tr>
</tbody>
</table>

6/26/2013
## Example – Environment Management

<table>
<thead>
<tr>
<th>Work Steps</th>
<th>Bare Metal</th>
<th>Virtual Machines</th>
<th>VM Library</th>
<th>Recipe Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify node types &amp; availability</td>
<td>30 min</td>
<td>15 min</td>
<td>15 min</td>
<td>2 min</td>
</tr>
<tr>
<td>Analyze/adjust resources</td>
<td>30 min</td>
<td>2-5 hours</td>
<td>35-50 min</td>
<td>0 min</td>
</tr>
<tr>
<td>Build /validate (per node)</td>
<td>7-9 hours</td>
<td>3-4 hours</td>
<td>40 min</td>
<td>13 min</td>
</tr>
<tr>
<td>Configure environment and test</td>
<td>60 min</td>
<td>30 min</td>
<td>30 min</td>
<td>5 min</td>
</tr>
<tr>
<td><strong>Totals (for 3 nodes)</strong></td>
<td><strong>23-29 hours</strong></td>
<td><strong>12-18 hours</strong></td>
<td><strong>3 ½ hours</strong></td>
<td><strong>46 minutes</strong></td>
</tr>
</tbody>
</table>

Reduced test time by more than factor of 10

- **Bare Metal**: A person installs all the software needed on each device
- **Virtual Machines**: A person loads a “snapshot” (binary file) of the complete software stack on each device
- **VM Library**: A computer loads snapshots and a person tests the results
- **Recipe Library**: A computer installs all the software needed on each devices and tests the results
Concept

• Programmatic & Technical Expertise
  – Explain the need and technology to Program Offices
  – Help Program Offices navigate the acquisition process and incentivize the development contractor to provide the necessary automation and maintenance capabilities
  – Help define how to test automation during development, at Operational Assessments, as well as a capstone event during IOT&E
  – Help tailor and rapidly configure tools to need
  – Help address technical and programmatic problems throughout development
  – Compile, organize, and share knowledge and lessons learned regarding approaches to automation
    • Efficiencies through the reduction of duplicative effort, reuse of existing and proven capabilities

The TACE will support USG Program Offices with Resources and Expertise, Helping to Meet the Need
# The Initial Library to Automate

<table>
<thead>
<tr>
<th>Test Case Name/Description</th>
<th>Complexity</th>
<th>Frequency</th>
<th>Level of Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP ECC CERT (Security Testing) Cross Process (CP)</td>
<td>Low</td>
<td>Monthly</td>
<td>Very High (click by click)</td>
</tr>
<tr>
<td>BOSS Test Case for Auto Testing</td>
<td>High</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td><strong>SAP Gui Upgrade Testing - J6C ECC</strong></td>
<td>Low</td>
<td>SAP GUI upgrade</td>
<td>Medium</td>
</tr>
<tr>
<td>RSW - Prioritization of WKF</td>
<td>High</td>
<td>Regression</td>
<td>High</td>
</tr>
<tr>
<td>Types 6, 7, A, N, P, V</td>
<td>High</td>
<td>Regression, Unit Test</td>
<td>High</td>
</tr>
<tr>
<td>Inactivation - List</td>
<td>High</td>
<td>Regression</td>
<td>High</td>
</tr>
<tr>
<td>SSR-SAT1 process</td>
<td>High</td>
<td>Regression, Unit Test</td>
<td>High</td>
</tr>
<tr>
<td>Matdet - ZCON</td>
<td>High</td>
<td>Regression</td>
<td>High</td>
</tr>
<tr>
<td>RSW - Purchase Approval</td>
<td>High</td>
<td>Regression, Unit Test</td>
<td>High</td>
</tr>
<tr>
<td>BOSS_EndtoEnd_TestCase</td>
<td>High</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td><strong>SAP ECC Cross Process Maintenance Window Validation Script</strong></td>
<td>Low</td>
<td>Maintenance</td>
<td>Very High (click by click)</td>
</tr>
<tr>
<td>SRM CERT Testing</td>
<td>Low</td>
<td>Monthly</td>
<td>High</td>
</tr>
<tr>
<td><strong>User access to R/3 WAS via Portal and SAPGUI</strong></td>
<td>High</td>
<td>Regression, Maintenance, COOP</td>
<td>High</td>
</tr>
<tr>
<td>NonPR LTC</td>
<td>High</td>
<td>Regression, COOP</td>
<td>High</td>
</tr>
<tr>
<td>cFolders PR</td>
<td>High</td>
<td>Regression, COOP</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>User access to drawings in cFolders controlled by license agreements, Vendor Tracking</strong></td>
<td>High</td>
<td>Regression, COOP</td>
<td>Medium</td>
</tr>
<tr>
<td>cFolders Archiving</td>
<td>High</td>
<td>Regression, COOP</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>End to end 339 case processing</strong></td>
<td>High</td>
<td>Regression, COOP, Unit Test</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Streamline 339 case processing</strong></td>
<td>High</td>
<td>Regression, COOP, Unit Test</td>
<td>Medium</td>
</tr>
<tr>
<td>ASSIST</td>
<td>High</td>
<td>Regression, COOP, Unit Test, Web</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>OpenText Repository Validation</strong></td>
<td>High</td>
<td>Regression, COOP, Maintenance</td>
<td>Low</td>
</tr>
<tr>
<td>PDMI CERT Testing</td>
<td>Low</td>
<td>Monthly</td>
<td>Low</td>
</tr>
</tbody>
</table>

6/26/2013
Industory Involvement

- Technical Exchange Meetings
  - March 26, 2013 with NDIA ICOTE
  - [This Meeting] with NDIA ICOTE & AFEI ADAPT

- Industry Days
  - Host a series of information gathering and technical exchange sessions focusing on the customer-community
    - DoD/IC
    - Civil
    - Commercial
  - Opportunity to discuss concepts and capabilities with the USG in group forums, as well as individual sessions where beneficial
  - Seeking industry insights and perspective on the role of Software Test Automation in acquisition, as well as how to properly incentivize and support comprehensive and mature software sustainment capabilities in present and future acquisitions
Contact Card

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