Excerpts for UNC Discussion
June 2, 2016
Getting Started!
XE Applications (currently available)

- Common DB Upgrade 9.4
- Registration SSB 9.4
  - Student Overall 9.4 & Registration 9.3 (going away)
  - Student APIs 9.5
- Faculty Grade Entry 9.4
- Advising 9.3 & Student Profile 9.2
- Event Management 9.3
- Attendance Tracking 9.2
- Purchase Requisition 9.0
- Catalog & Schedule 9.3 (going away)
  - Academic History 9.1
  - Employee Profile 9.1
  - Position Description 9.1
  - Application Navigator 1.4
  - HR Transformed Forms 9.0
  - General Transformed Forms 9.0
  - Finance Transformed Forms 9.0
Recommended Sizing

Most applications won’t have a high volume of traffic.

Registration SSB is the exception.

For peak loads

• Consider 4 cores and 8-12GB per 800 concurrent student registrations

• Have multiple servers and load balance
### Registration Load Comparison

#### 2 CPUs, 400 Concurrent registrations (milliseconds)

<table>
<thead>
<tr>
<th>Label</th>
<th># Samples</th>
<th>Average</th>
<th>Median</th>
<th>90% Line</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/submitRegistration/batch</code></td>
<td>2504</td>
<td>3546</td>
<td>1903</td>
<td>8704</td>
</tr>
</tbody>
</table>

#### 4 CPUs, 400 Concurrent registrations (milliseconds)

<table>
<thead>
<tr>
<th>Label</th>
<th># Samples</th>
<th>Average</th>
<th>Median</th>
<th>90% Line</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/submitRegistration/batch</code></td>
<td>3100</td>
<td>1003</td>
<td>936</td>
<td>1252</td>
</tr>
</tbody>
</table>
### Registration Load Comparison

#### 4 CPUs, 800 Concurrent registrations (milliseconds)

<table>
<thead>
<tr>
<th>Label</th>
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<th>Average</th>
<th>Median</th>
<th>90% Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>/submitRegistration/batch</td>
<td>11884</td>
<td>1057</td>
<td>1035</td>
<td>1362</td>
</tr>
</tbody>
</table>

#### 600 Concurrent registrations SSB (milliseconds)

<table>
<thead>
<tr>
<th>Label</th>
<th># Samples</th>
<th>Average</th>
<th>Median</th>
<th>90% Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Register For Classes</td>
<td>681</td>
<td>1838</td>
<td>453</td>
<td>5535</td>
</tr>
</tbody>
</table>
Do you have a version control system in place?
- Git is Ellucian’s VCS for distributing XE source code

Do you have an existing SSO solution?
- Both CAS and SAML2 now supported

Have you looked at Ellucian Solution Manager (ESM)?
- Replacement for traditional hand-install process
In the past source code was distributed with the release but there are now source code repositories. First steps:

- Request accounts (two at most) from Ellucian to download git repositories
- Set up local repository to host code for developers
- Great article in the eCommunities on how to do this

Git can work with SVN

Git server

- SIG is starting to implement Gitlab (free version)
SSO implementation

CAS - Central Authentication Services
SAML2 - Security Assertion Markup Language 2.0

SSO Components

• BEIS – Account provisioning to open LDAP (ADAP for AD)
  ▪ Needs BEP 2.0 (no streams)

• SSO Manager

• Maintain GOBUMAP
  ▪ Populate initially
  ▪ Keep up to date via trigger(s)

EIS (Ethos Identity Services) – Supports both CAS and SAML2

• Shibboleth also now support both CAS and SAML2
Server based software to help support your Banner software environment by providing the following:

- Install Banner upgrades and deployments
- Provision a new Banner environment
- Provision a new Application to an existing Banner environment
- Self Updating
- NOTE - Does not handle configuration files for XE Applications

Required for installation of Transformed forms

- There is not a traditional “gostage” process

Complex setup but seems to be a significant improvement from the traditional “gostage” process once fully configured
Common menu system for INB and XE Administrative applications

- Provides single point to navigate between Banner 8 and XE
- Required for the Transformed forms
- Relies on SSO (CAS or SAML2), including SSO Manager for INB
- Banner forms released prior to 12/2014 must be run through the Seamless Navigation Enhancement Utility
- XE SSB applications are NOT included in the current release
Local git repository

• Look into git training
  ▪ Free training videos at GitHub (http://training.github.com)

IDE (Integrated Development Environment)

• IntelliJ is very popular (and my choice)
  ▪ may be able to get educational pricing
• Eclipse is needed if you plan to modify (or look at) the Transformed forms
• Netbeans, Groovy/Grails Tool Suite, others

Developer workstations will need to be really beefy (that’s the technical term)

• Application builds (what we used to call compiling) are very intensive
XE wants lots of memory!

- Managed Server startup parameters
  - `-server -Xms2g -Xmx4g`
  - `-XX:MaxPermSize=2g -XX:PermSize=512m`
  - If there are several modules, then bump the Xmx up, sometimes as high as 8g or even 12g

- Tomcat
  - `JAVA_OPTS="-server -Xms4g -Xmx18g -XX:MaxPermSize=4g"
    - (This is for a single test instance hosting all modules)"`
Grouping XE Applications

- Option 1: One managed server for everything
  - Likely unrealistic given the memory demands of XE
  - If you shut it down, you shutdown EVERY module
- Option 2: One managed server per module
  - Makes for lots of managed servers and is not very efficient
- Option 3: Group by function
  - E.g., One server for Finance SSB modules, One for Student SSB modules, etc…
- Option 4: Be creative! (And scale to meet demand)
Decide on managed servers in WebLogic or Tomcat instances

- Group by function, load, and which things can be shutdown in tandem if needed.
- Consider policies about what can be exposed outside the firewall
- StudentRegistrationSsb gets it’s own managed server(s).
- Multiple machines (VMs) are recommended beyond 800 concurrent users (registration)
Route traffic through a load balancer

- Lets you change the back-end servers without affecting the front end addresses
- Simpler to manage SSL
- You can add servers transparently to scale for demand
Sample XE Architecture

- Load Balancer
- EIS Servers
- Admin Pages
- XE Self Service
- XE Registration
Summary

Determine Hardware and Software needs
Implement SSO
Implement ESM
Consider Load Balancers
Decide on WebLogic or Tomcat
Prioritize modules
Install, Configure, Deploy, Repeat