

# Exceptional Student Experience: Architecture & Design

Paul Band & Andrew Tomlinson



# Agenda

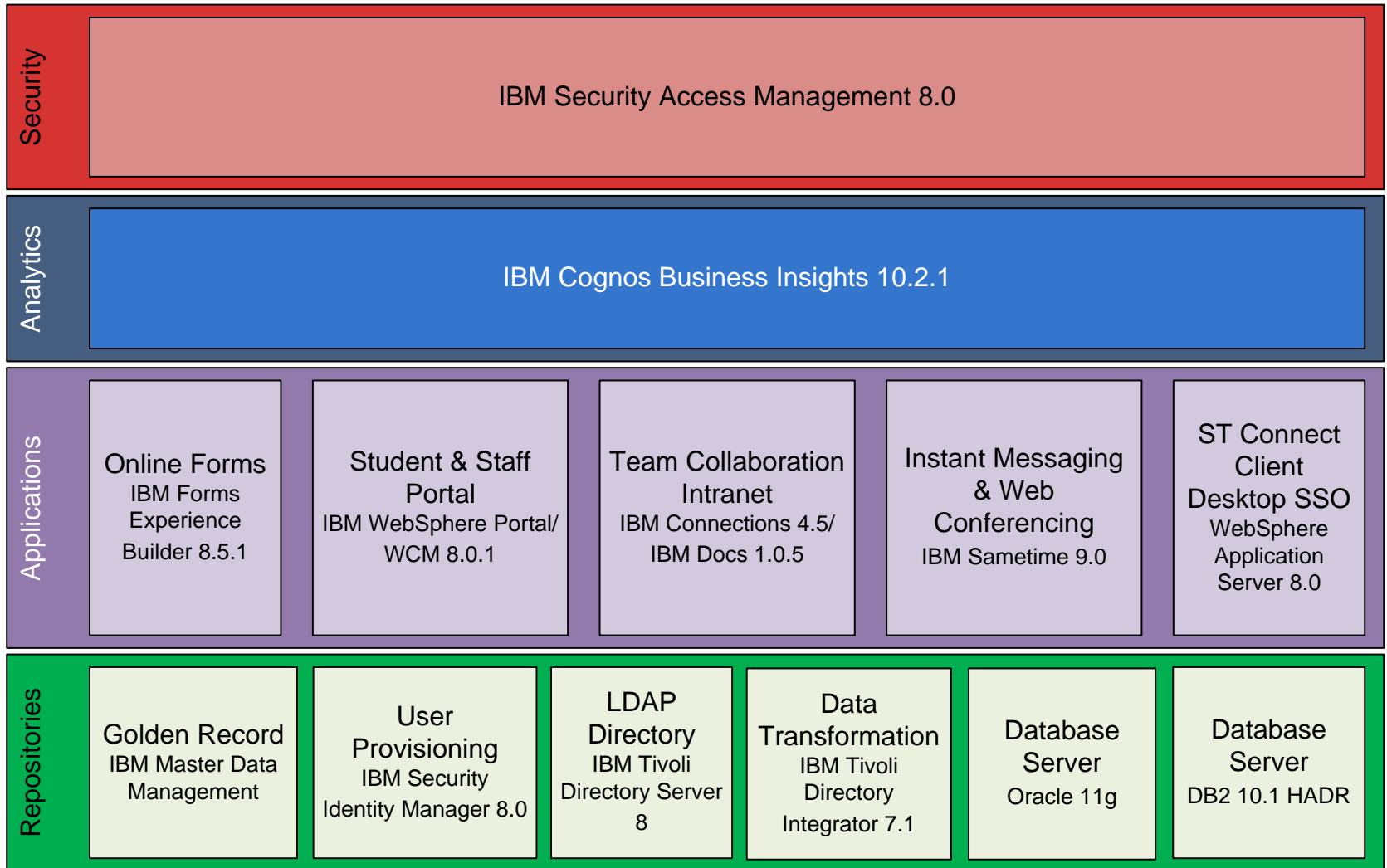
- ❑ Solution Overview
- ❑ Look and Feel
- ❑ Components:
  - ❑ Forms Experience Builder (FEB)
  - ❑ Web Application Bridge (WAB)
  - ❑ Portlets
  - ❑ Moodle
- ❑ Achitectural Diagram
- ❑ Resilience Patterns
- ❑ Web Content Management
- ❑ Search
- ❑ Performance Testing/Tuning
- ❑ Content Migration
- ❑ Go Live/Switch Over
- ❑ Analytics
- ❑ Custom Error Pages

## Introduction

# London South Bank University

- IBM worked with LSBU to deliver a brand new student and staff collaboration experience
- Program would encompass requirements around security, collaboration and analytics
- Complete overhaul of existing student site, including content migration
- Social & Collaboration tools for staff
- Hosted initially on-premises virtualised infrastructure
- Plan in place to migrate to IBM SoftLayer
- Commenced April 2014

# Solution Overview



# Look and Feel 1/3

Before:

The screenshot shows the London South Bank University website. At the top, there is a navigation bar with links for 'LSBU Home', 'Contact Us', 'Site Map', and 'Accessibility'. A 'Quick Links' dropdown menu is visible. On the right, there is a search box labeled 'Search LSBU:'. The main header features the university's name 'London South Bank University' and the 'my.lsbu' logo. Below the header is a dark blue navigation bar with links for 'Home', 'Academic', 'Student Life', 'Library', 'IT Support', 'Employability', 'Notices', and 'Events'. The central focus is a large orange and blue banner for a 'VOLUNTEER FAIR' on Thursday 13th Nov, 11am-3pm, at The Student Centre. To the right of the banner is a 'Log In' section with a welcome message and instructions on automatic login. Below the banner is a 'Personal Details' section with links to Coursework Tracker, Email and files, Library Loans, My Timetable, Virtual Learning Environment (Blackboard), and Virtual Learning Environment (Moodle). Next to it is a 'Student Services' section with links to Accommodation, Disability & Dyslexia Support, Financial Support, Students' Union, Maths Support, and Communication Skills Development. To the right of that is a 'Resources' section with links to Exam Timetables, Academic Calendar, Useful Contacts, Library Catalogue, Make a Payment, Maps, and Regulations & Policies. On the far right is a 'Notice Board' section with announcements about an LSBU stall at Lower Marsh Market, a £100 Amazon voucher contest, Global Entrepreneurship Week, and Library Skills Days. At the bottom, there are links for 'Terms and conditions', 'Freedom of information', 'Privacy statement', and 'Cookie usage'. The footer includes the copyright notice 'Copyright © London South Bank University' and social media icons for Facebook, Twitter, RSS, and YouTube.

# Look and Feel 2/3

- IBM Design Team
- Update IA
- HTML prototype

The screenshot displays the London South Bank University website interface. At the top, a dark navigation bar includes a user profile section with 'Welcome Maxwell Wesley', 'my profile', and 'Log Out', alongside icons for user groups and a 'VLE' link. Below this, the site's identity is established with 'London South Bank University' and the 'my.lsbu' logo. A secondary navigation bar offers links for 'Corporate site', 'Students', 'Staff', and 'Alumni'. A search bar is positioned to the right of the logo.

The main content area features a horizontal menu with tabs for 'My Course', 'Library & Academic', 'Student Life Centre', 'Social Life', and 'Employability'. The central focus is a large banner for an event titled 'Intellectual Property: Trade Secrets & Know-How'. The banner includes a lightbulb icon with gears inside, a date 'Wednesday 1 April at 5pm', and a location 'Clarence Centre for Enterprise and Innovation'. A call to action 'Register here >>' is prominently displayed. A 'Student Enterprise at LSBU' badge is also visible on the banner.

On the right side, there are two widget areas. The 'Alerts' section shows a message: 'According to our records there is query regarding your tuition fee account. Please contact credit control on 0207 815 6335', with a 'No Alerts' status below. The 'Notices' section, marked with a '0 latest' indicator, contains a 'New announcement on LLR Home: Library and IT Support' with a 'See More' link.

At the bottom, there are two more widget areas. The 'News' section, with a 'What's on' sub-tab, features a headline: 'Win £100 and work experience with our Marketing Department in our Graphic Design Competition'. The 'My Now & Next' section, titled 'View My Timetable', shows a date '24Mar 2015' and a course listing: 'Welfare, Policy and the Law in Social Work Practice' with a time slot '09:00 -11:00 | K-305 | Keyworth Centre'.

# Look and Feel 3/3

## Responsive Design

my profile Log Out Menu

Corporate site | Students | Staff | Alumni

**London South Bank University**

my.lsbu

Search Site


### Employability

Toggle sub menu navigation

Employability

- Student Enterprise
- Student Ambassadors
- Work for LSBU**
- JobShop / (JobShop) Online
- Career Gym
- Skills Zone
- Recruitment Agencies

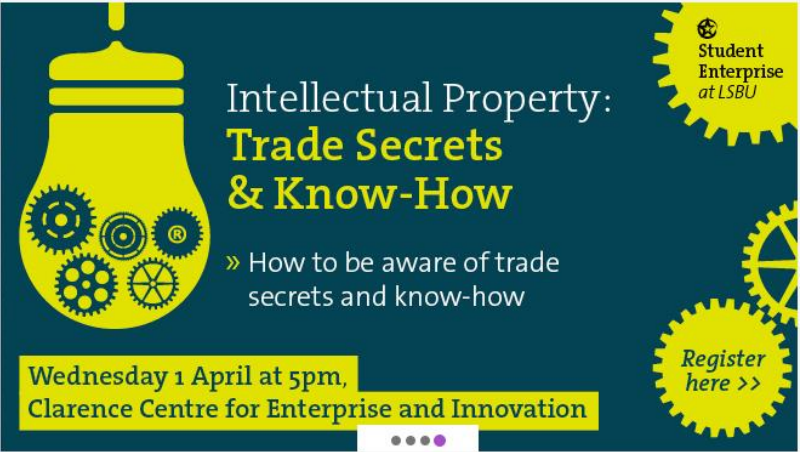
### Employability and Enterprise



<https://my.lsbu.ac.uk/my/portal/Employability/Work-for-LSBU>

my.lsbu

Search Site



**Intellectual Property: Trade Secrets & Know-How**

» How to be aware of trade secrets and know-how

Wednesday 1 April at 5pm,  
Clarence Centre for Enterprise and Innovation

Student Enterprise at LSBU

Register here >>

#### Alerts

According to our records there is query regarding your tuition fee account. Please contact credit control on 0207 815 6335

No Alerts

#### Notices

New announcement on LLR Home: Library and IT Support  
[See More](#)

News What's on

Win £100 and work experience with our Marketing Department

# Forms Experience Builder

- FEB 8.5.1
- 14 forms
- Calls to web services and puma
- View responses

## Late Submission Form

### My Course

My Course Details

My Timetable

VLE (Moodle)

Coursework Tracker

My Results

### Exams & Assessments

Submitting your coursework

Extenuating circumstances

Late Submission Form

Alternative Exam arrangements

Exams Timetables

Past Exam Papers

Appeals

Course Administration

Academic Calendar

Research Degrees

Postgraduate Courses

This form should be filled in if you are unable to hand your work in by the deadline. The Academic Regulations allow you to hand your work in up to 2 weeks after the deadline. However, your mark will be capped to 40 if you are on an Undergraduate course and 50 if you are on a Postgraduate course.

If you have not submitted your Coursework within this 2 week period, or if you want your work to be uncapped you will need to submit a claim for [extenuating circumstances](#)

This two week period is only permitted for written coursework including Undergraduate and Masters level dissertations. Other forms of assessment such as presentations, in-class tests etc are not covered by this process and must be completed on time.

This two week period is available if you are being assessed for the first time or if your assessment has been deferred. It is not available for referred assessments.

If any of your enrolment details are incorrect please contact your [School Office](#)

Further guidance notes can be found here; [Submitting work late](#)

**Course**

**Module**

**Course Work Title**

**Original published submission date**

**Your submission date is in the past. Please be aware that the late submission form should be completed in advance.**

Do you have support arrangements in place with Disability and Dyslexia Support ?

By submitting this form you are asking for your coursework to be marked if it is submitted within two weeks of the original deadline; the mark you receive will be capped

Submit

Cancel



# Web Application Bridge

- 10+ existing applications
- Pass data from portal to apps
- Quick, zero to minimal dev

Home
My Course
Library & Academic
Student Life Centre
Social Life
Employability

My Course » My Timetable

## My Timetable

Welcome to your timetable.

As a fully enrolled student you have access to both your Personal Timetable and a Course Timetable using the buttons below. Please check your timetable at least once a week during each semester for changes – just in case - and remember that you may have to scroll down the page in order to see all the events taking place.

If you think you are not seeing the correct modules in your Personal Timetable, please ask your [School Office](#) to check your registration details. A [Module Co-Ordinator](#) can help if you have any queries about specific teaching events in your Personal Timetable, such as the seminar groups for a module.

**Please note:** some teaching groups are still being configured due to late enrolment so if you can see more than one event at the same time in your Personal Timetable please check back nearer the time or consult your [School Office](#).

View Course Timetable
View Personal Timetable
Personal View
Print This

**Academic Year** Academic Week

2014/15 S2: (16 Mar 2015 to 22 Mar 2015)

[reset week »](#)

|               | 13:00  | 13:30 | 14:00 | 14:30 | 15:00   | 15:30 | 16:00 | 16:30 | 17:00 |
|---------------|--|-------|-------|-------|---|-------|-------|-------|-------|
| <b>Mon 16</b> |  |       |       |       | Land Law<br>NHLT (Faraday Wing)<br>LEC001, Andronicou, Louise<br>15:00 - 17:00  |       |       |       |       |
| <b>Tue 17</b> |  |       |       |       | International Protection Of Human Rights<br>K-405 (Keyworth Centre)<br>Unger, Andy<br>15:00 - 17:00   |       |       |       |       |
| <b>Wed 18</b> |  |       |       |       | The Law Project<br>K-305 (Keyworth Centre)<br>Silver, Kim<br>15:00 - 17:00  |       |       |       |       |
| <b>Thu 19</b> |  |       |       |       |   |       |       |       |       |
| <b>Fri 20</b> | Land Law<br>NHLT (Faraday Wing)<br>Andronicou, Louise<br>13:00 - 14:00 |       |       |       | Employment Law<br>LR-10 (London Road)<br>Chohan, Risham<br>15:00 - 17:00<br><br>Employment Law<br>LR-373 (London Road)<br>Chohan, Risham<br>15:00 - 17:00 |       |       |       |       |
| <b>Sat 21</b> |  |       |       |       |   |       |       |       |       |
| <b>Sun 22</b> |  |       |       |       |   |       |       |       |       |

**Key to event types:** Clinical Computer Lab Laboratory Lecture Seminar Tutorial Work Shop

Useful Links: [Campus Access](#) | [Southwark Campus Map](#) | [Havering Campus Map](#)

## Portlets

- WEF portlets
  - Now and Next
  - Profile information
  - Make a payment
- Standard Portlets
  - Favourite Links – user's most visited pages
    - Asynchronous call to pass page name and url to servlet
    - Stored in DB

### Payments

Print (Amount in Credit)

21.97

[Pay online](#)

*Any payment or credit will be reflected in your balance within 48 hours*



Name

Mr Maxwell Wesley

Date of Birth

19 Apr 1963

Gender

Male

Student Number

8852612

*If any details in this section are incorrect, please contact the [Student Life Centre](#)*

### Favourite Links

[My Timetable](#)

[Library](#)

[Exams & Assessments](#)

[My Course Details](#)

[News](#)

# Moodle

- Simple portlets to consume custom feed from moodle
- Built using WEF

## Notifications

My Course

1 - 4 of 4

Page 1

[Previous](#) | [Next](#)

| Publish Date | Title  | Description  |
|--------------|--|--|
| 03/02/2015   | New announcement on LLR Home: Library and IT Support | <a href="#">A new announcement entitled 'Upcoming Library workshops' was posted on the site for LLR Home: Library and IT Support</a> |
| 27/01/2015   | New announcement on Test Site 2 for McGraw Hill      | <a href="#">A new announcement entitled 'test' was posted on the site for Test Site 2 for McGraw Hill</a>                            |
| 26/01/2015   | New announcement on Test Site 2 for McGraw Hill      | <a href="#">A new announcement entitled 'test' was posted on the site for Test Site 2 for McGraw Hill</a>                            |
| 09/10/2014   | New announcement on 14/15, Memory Games              | <a href="#">A new announcement entitled 'Memory Games Database Link' was posted on the site for 14/15, Memory Games</a>              |

Show 5 items

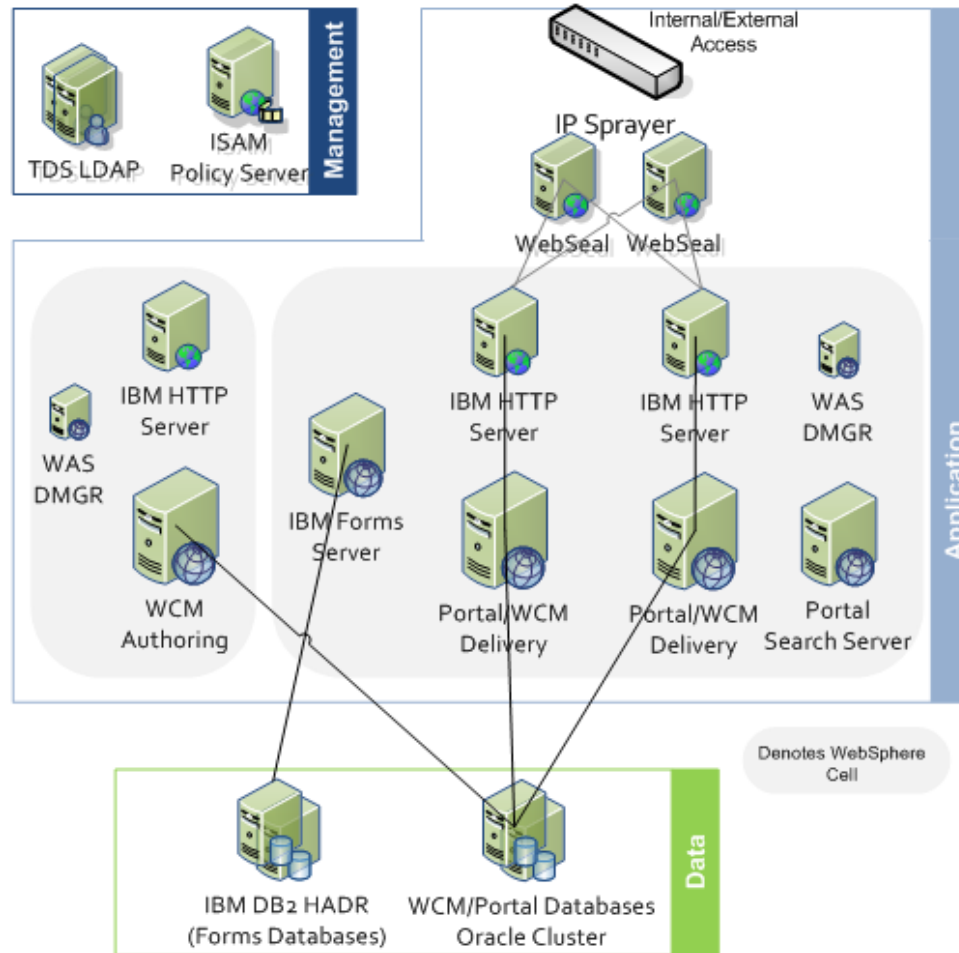
1

1

[Previous](#) | [Next](#)

# Architectural Diagram: Portal and WCM

LSBU WebSphere Portal 8.0.0.1  
Production Architecture Diagram

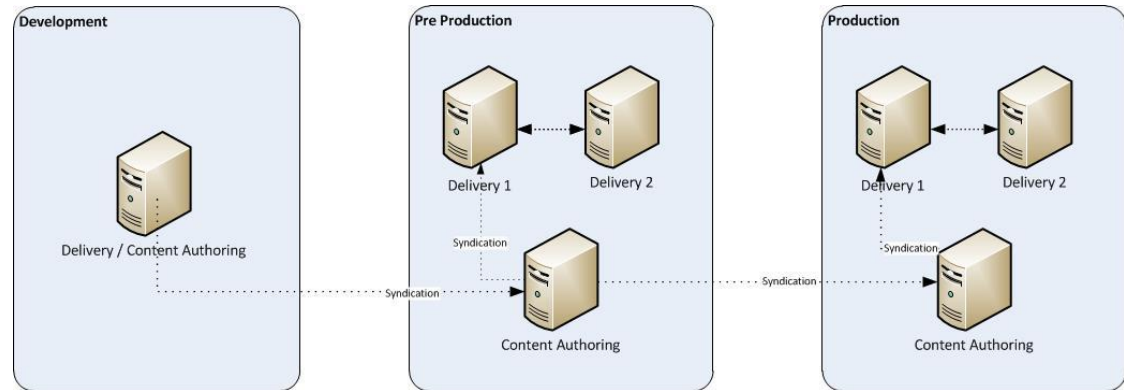


## Resilience Patterns

| Product Aware                      | Independent Instances |
|------------------------------------|-----------------------|
| WebSphere Portal / WCM             | IBM HTTP Servers      |
| DB2                                | SMTP Relay Server     |
| IBM Tivoli Directory Server (LDAP) | NFS File System       |
| WebSEAL                            |                       |
| BIG-IP F5 Load Balancer            |                       |

# Web Content Manager

- Separate Authoring Server



- Authoring templates - articles, news, events

Draft -> Review -> Approve -> Publish

40 editors

10 approvers

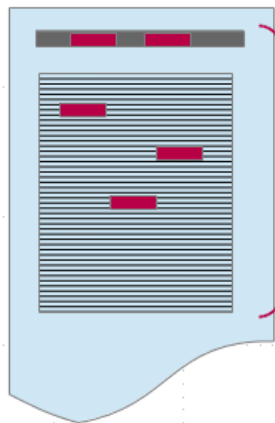
3 publishers

- Slideshow from Content Template Catalogue

## Search

- Clustered environment = remote search server
- Adding “boost factor”

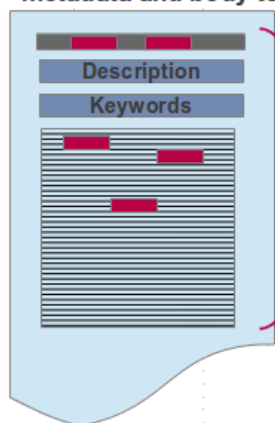
Web page with title and body text



= 'content'

*Any matches in content  
contribute equally to  
Rank score*

Web page with title,  
metadata and body text



= 'content'

*Metadata field values  
Are also added to  
'content' field.  
Still: any matches in content  
contribute equally to  
Rank score*

Name: boostingSettings

```
Value: {"phraseBoost": {"Enabled": "true"}, "fieldBoost":
[{"field": "title", "boost": 3.0} , {"field": "description",
"boost": 3.0}, {"field": "keywords", "boost": 2.0}]}
```





- “And” rather than “Or”

# Performance Tuning

- Initial Sizing produced by IBM Techline
- Sizing reviewed and optimised according to past experience
- Jmeter used to simulate load
- 2x Portal JVMs per node caused excessive GC
  - VMWare vSphere with WAS: <http://www.vmware.com/vmtn/resources/527>
  - VMWare with Java applications: <http://www.vmware.com/resources/techresources/1087>
  - Reduced to single JVM per node with large heap size
- AJAX Proxy configuration optimised for greater concurrent connections (FEB)
- Best practice Portal Tuning applied
  - JVM heap, GC Nursery, Session timeouts, connection pools, cache, O/S kernel (network), plus others..
- Caches monitored using IBM WebSphere Portal cache viewer
  - Monitor cache hit rate. Check to see if cache full (if so increase size)
  - Optimised based on monitoring during performance testing

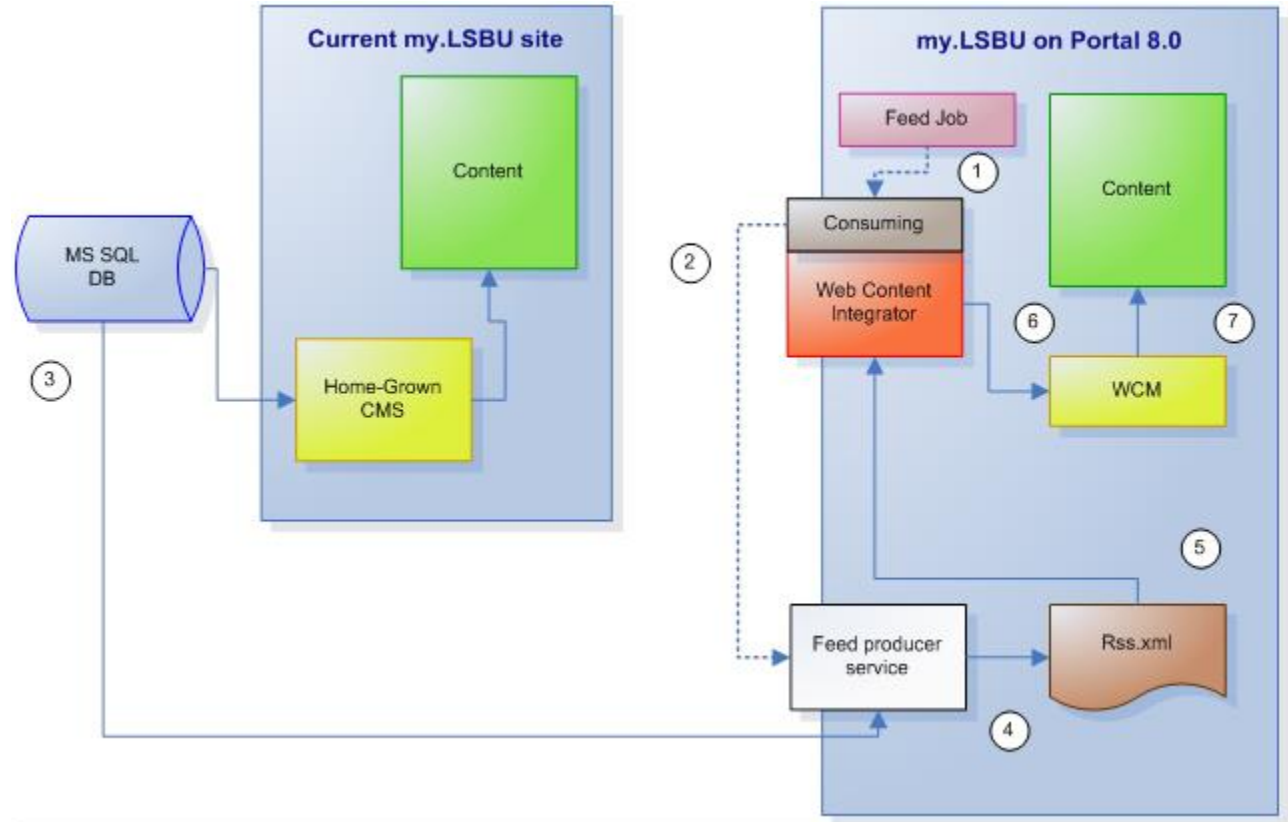


# WebSphere Portal Cache Monitor

| Cache name                                     | Current entries / capacity | Lookup count | Hitrates | Tuning notes  |
|--|----------------------------|--------------|----------|---|
| com.ibm.wps.cp.models.ModelCache.ResourceModel | 197 / 200                  | 1,883,398    | 94.6%    |  This cache is almost full, so consider increasing the size of this cache.         |
| com.ibm.wps.cp.models.ModelCache.TagModel      | 199 / 200                  | 1,527,038    | 93.1%    |  This cache is almost full, so consider increasing the size of this cache.         |
| com.ibm.wps.cp.rating.RatingSpaceCache         | 94 / 10,000                | 187,916      | 39.0%    |   |
| com.ibm.wps.cp.tagging.ResourceModelCache      | 20 / 10,000                | 83,949       | 35.6%    |   |
| com.ibm.wps.cp.tagging.TagCache                | 0 / 10,000                 | 16           | 0.0%     |  This cache does not appear to be used. Consider reducing the size of this cache. |
| com.ibm.wps.cp.tagging.TagNameMissCache        | 1 / 10,000                 | 1,493,635    | 100.0%   |  This cache is giving a good hitrate.  |

# Content Migration

- Use Web Content Integrator
- Minimal Change Freeze
- Repeatable
- Process delta



## Go Live: Switch Over To The New Site

- DNS name my.lsbu.ac.uk was reserved for the existing site
- Change BIGIP F5 load balancer profile
- Built new Portal based on my1.lsbu.ac.uk
- Use relative URLs
- Update WebSEAL Virtual Junctions
  - (defaults to standard junction if virtual not found)

# Site Analytics

- Use WebSphere Portal Site Analytics

- Writes a log for each page request

```
- 148.162.74.149 - bandp [04/Mar/2015:00:51:03 +0000] "GET /Page/My-Course/My-Results HTTP/1.1" 200 -1 "" "Mozilla/5.0 (iPhone; CPU iPhone OS 8_1_2 like Mac OS X) AppleWebKit/600.1.4 (KHTML, like Gecko) Version/8.0 Mobile/12B440 Safari/600.1.4"
```

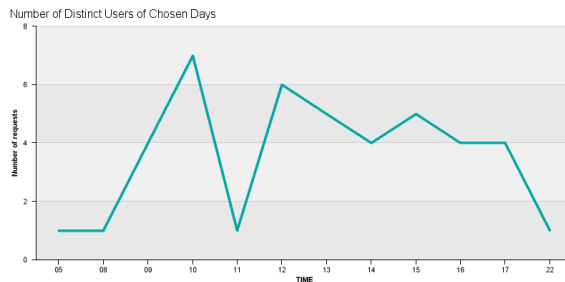
IBM Cognos Viewer - Daily Logins

London South Bank University

Daily Portal Usage

Number of distinct users accessing the portal each day

| Number of requests | 05 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 22 | Summary for Whole Day |
|--------------------|----|----|----|----|----|----|----|----|----|----|----|----|-----------------------|
| 5 Jan 2015         | 1  | 1  | 3  | 3  |    |    |    |    | 2  |    |    |    | 4                     |
| 6 Jan 2015         |    |    |    | 4  | 2  | 2  | 1  | 4  |    |    |    |    | 7                     |
| 7 Jan 2015         |    | 1  | 2  | 3  | 3  |    |    | 1  | 3  |    |    |    | 7                     |
| 8 Jan 2015         |    |    | 2  | 1  | 2  | 3  | 2  | 2  |    |    |    |    | 5                     |
| 9 Jan 2015         |    |    | 1  | 1  | 3  | 5  | 3  | 1  | 1  | 4  | 1  |    | 8                     |
| Average            | 1  | 1  | 2  | 3  | 1  | 2  | 4  | 2  | 1  | 3  | 4  | 1  | 6                     |



# Google Analytics

- Simple to implement
- Uses active site analytics

1. Download google
2. Create a custom aggregator to query page data

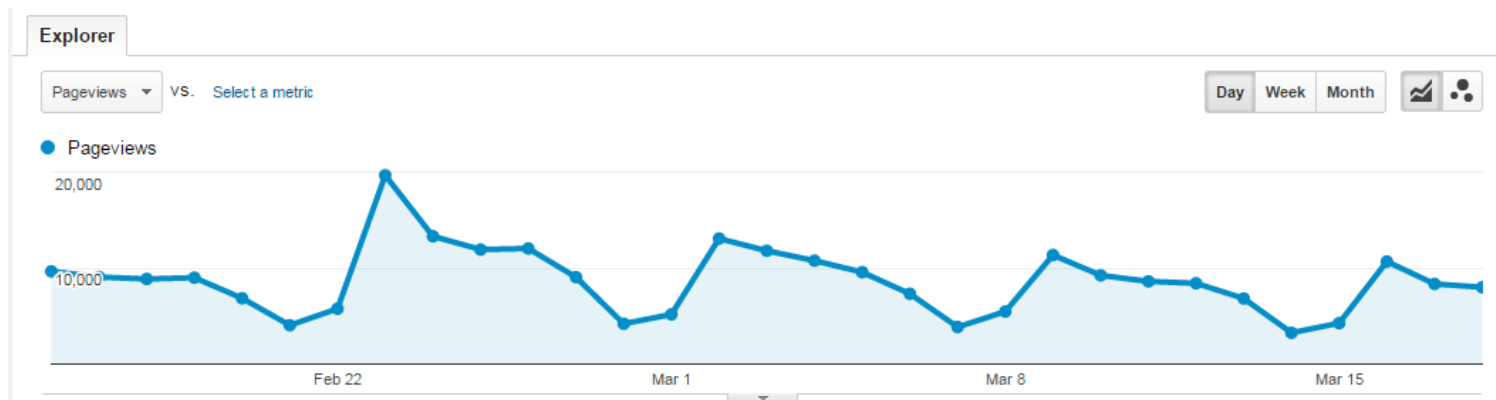
```
pageTitle = (query("[class='asa.page.title']",  
node)[0].innerHTML).replace(/&/g, '&');
```

```
pageUrl =query("[class='asa.url']", node)[0].innerHTML;
```

```
ga('send','pageview', {'page': pageUrl,'title': pageTitle });
```

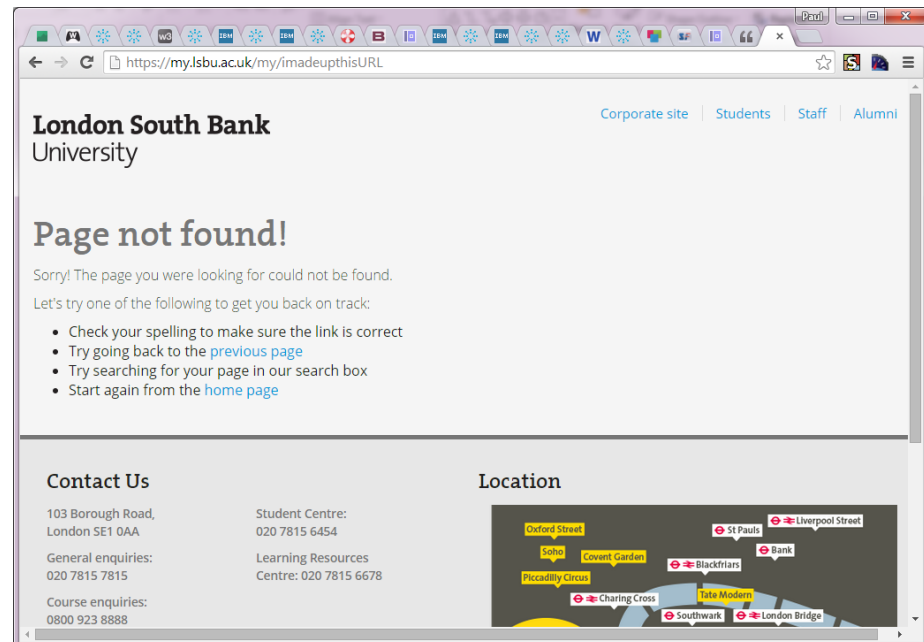
2. Package js in theme

3. Add in meta data in page properties referencing aggregator and dependencies



## Error Pages 1/2

- Portal Default Behaviour: Redirect to homepage
  - Requirement: Redirect to customised error page
  - <http://www-01.ibm.com/support/docview.wss?uid=swg21674823>
  - <http://www-01.ibm.com/support/docview.wss?uid=swg21411195>
- Modify Portal web.xml to configure custom error pages
- Server the custom error pages from HTTP Server
- Can create custom error pages for most HTML error codes (e.g. 500 / 403)



## Error Pages 2/2

### 1. Export the Portal enterprise application [wps.ear]

```
./wsadmin.sh -user admin_user_id -password admin_password -c '$AdminApp export wps /tmp/wps.ear'
```

### 2. Use EARExpander to expand or collapse wps.ear:

```
./EARExpander.sh -ear /tmp/wps.ear -operationDir /tmp/wps_expanded/ -operation expand
```

### 3. Modify the error handling [web.xml] inside wps.ear

```
<error-page>  
<error-code>404</error-code>  
<location>/html/error404/error404.html</location>  
</error-page>
```

### 4. Collapse files into an updated wps.ear using EARExpander with collapse operation

### 5. Import the updated enterprise application

```
./wsadmin.sh -user wpsadmin -password wpsadmin -c '$AdminApp install /tmp/wps.ear {-update -appname wps -  
deployejb -deployejb.classpath /usr/IBM/WebSphere/PortalServer/base/wp.base/shared/app/wp.base.jar}'
```

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# Questions

