DB2 for z/OS Outreach Program

**Presenters:**

- Jasminder Singh, IBM
- Teng-Sheng Moh, San Jose State University
- Qin Liu, Tongji University
- Angelo Corridori, Marist College
Acknowledgments

Business Executives

- Dan Wardman
  VP, IM Mainframe SW
- Greg Lotko
  VP, Warehouse Solutions
- Rick Bowers
  Director, DB2 for z/OS
- Gene Fuh
  DE & Senior Manager
  DB2 for z/OS
- Jim Teng
  DE, DB2 for z/OS

Technical Executives

- Leilei Li
  Development Manager, DB2 for z/OS
- Sara Guyer
  Senior Dev Manager, DB2 for z/OS
- Fen-Ling Lin
  Development Manager, DB2 for z/OS
- Jasminder Singh
  Development Manager, DB2 for z/OS
Acknowledgments

Universities in United States

Universities in China
Agenda

• Brief Introduction
  – Customer outlook and DB2 for z/OS
  – Challenges

• Teaching Mainframe Skills
  – Vision
  – Courses

• DB2 for z/OS Education Advisory Council
  – Mission
  – Future

• Teaching DB2 for z/OS
  – Tongji University
  – San Jose State University
  – Marist College
Customer Outlook for Mainframe Industry

Annual Worldwide Mainframe Industry Survey
1,000+ large mainframe customers

Highlights of the survey include:

• Respondents consider mainframes as critical to service oriented architecture and web services initiatives as a data hub and transaction server

• 74% of respondents do not believe they can successfully move mission critical workloads to a distributed platform at any cost

Survey conducted by BMC Software, as reported in Business Wire on 8/28/07
Interesting Facts about DB2 for z/OS

- **Used by...**
  - The top 59 banks in the world
  - 23 of the top 25 US retailers
  - 9 of the top 10 global life/health insurance providers

- **Performance, Performance, Performance**
  - Delivered peak online throughput of 15,353 transactions per second for a large Asian bank benchmark. 18 million transactions completed in 20 minutes.
  - Supports the world’s largest known peak database workload - 1.1 Billion SQL statements per hour at UPS
  - The world’s largest known transaction processing database – 23.1 TB at UK Land Registry
Challenges

Compilers

DB2

z/OS

Transaction Management

Development Tools

IMS

Systems Management

“How do I start?”

New Hire

June 21 – 23, 2009
Poughkeepsie, New York
Teaching Mainframe Skills
Enhancing IBM Mainframe Skills

Today
- Training your "in-house" skills
- Road shows and workshops
- Skills vitality and certifications

Building 20,000 Skilled Mainframe Professionals by 2010
- IBM academic initiative for zSeries
- Educating university/college students worldwide
- New and updated courses

Simplifying Software Management for Next Generation
- Basics information
- Easy to use/learn portal
- Automated tasks and integrated software
DB2 Outreach Program – the vision

- CIO/CTO Briefing
- DB2 Annual Technical Forum
- DB2 Certification Program
  - DB2 for z/OS Fundamentals
  - DB2 System Management
  - DB2 for z/OS Application Development
  - DB2 for z/OS Performance Tuning
- IBM Teams
- CIO/CTO
- Universities
- Curriculum
- Workshops
- DBA Sys Prog. App. Dev
- DB2 Vendors
- DB2 RUG

June 21 – 23, 2009
Poughkeepsie, New York
DB2 Outreach Program

• Building up the world-wide DB2 user community
  – Universities
    – Faculty members
    – Students
  – Customers
    – Application developers
    – System administrators
    – Database administrators
    – IT managers and CTO
  – Vendors and business partners
  – IBM
    – DB2 development team
    – IBM global service team
    – IBM marketing team
DB2 Outreach Program courses

• DB2 for z/OS Fundamentals
• DB2 for z/OS Query Optimization and Performance Tuning
• DB2 for z/OS Application Development
Course I - DB2 for z/OS Fundamentals

• A general introduction to the architecture of DB2 for z/OS
• Understand scenarios of using DB2 for z/OS in the industry
• Understand the features of DB2 for z/OS
• Course included in the curriculum of Tongji University, Marist College and SJSU
Course II – DB2 for z/OS Query Optimization and Performance Tuning

• Overview of Query Processing
• Understand the methodology of Query Optimization
• A general introduction of Query Performance Tuning
• Course included in the curriculum of Tongji University and SJSU
Course III - DB2 for z/OS Application Development

- A general discussion of DB2 application development environment
- Discusses how to design and write application programs that access DB2 for z/OS
- Discuss the key features in DB2 for z/OS to support Application Development
- Course added to Tongji University and SJSU curriculum
GA Announcement Of Courses

• Today, we are announcing the General Availability of these three courses

• Any school that is member of IBM Academic Initiative should be able to access and download the education material

• Created in collaboration with selected schools and IBM

• Feedback welcomed
DB2 for z/OS Education Advisory Council (DEAC)
DEAC formation announcement

- Formation of DB2 for z/OS Education Advisory Council (DEAC)

- Founding members are: San Jose State University, Marist College, Tongji University, Illinois State University and IBM

- Quite a few other schools that are interested in this program

- Opening membership to conference participants and beyond
DEAC Mission Statement

- Foster collaboration between schools, customers, vendors and IBM to promote DB2 for z/OS and eventually z/OS based education
- Ownership of DB2 for z/OS courses which includes the revision of course work material as well as evaluating change requirements
- Promoting DB2 for z/OS education by creating a community of schools that are currently teaching these courses or have definite plans to do so
- Provide guidance to new schools that are interested in teaching these courses. Work closely with faculty members to deploy the education package as live or online courses
- Collaborate with IBM IAI to use existing z/OS training material and classes for new faculty members
- Solicit feedback from faculty members teaching the courses and manage change requests
DEAC Mission Statement

- Fostering partnerships among schools to jointly publish textbooks, research papers in context of DB2 for z/OS
- Working closely with IBM team members to drive suggestions for the success of this effort
- Creating meaningful projects for graduate and undergraduate students. Identifying opportunities to solicit project ideas from customers.
- Increase awareness amongst faculty members, students about how enterprise customers use DB2 for z/OS
- Connect schools and customers interested in hiring students with z skills
DEAC Focus Items

• **Short term goals**
  – Promoting the adoption of courses
  – Providing guidance to new schools that want to teach these courses
  – Connecting customers and vendors with schools for recruitment purposes
  – Collaborate with IAI and ECC

• **Long term goals**
  – Review and update course material
  – Develop research projects, books, speaker series
  – Create certification program
Teaching DB2 for z/OS at Tongji University

Dr. Qin Liu
Executive Dean, School of Software Engineering
Tongji University
Mainframe Education in Tongji University

1. Curriculum

2. Second Classroom

3. International Cooperation
Majors in School of Software Engineering

Enterprise Computing (Mainframe Technology)

Software Engineering

Human-Computer Interaction
Curriculum: Enterprise Computing (Mainframe Technology)

- **Fundamental Courses of Computer Science**
  - Discrete Mathematics
  - Computer Basics
  - **Assembly Language (Mainframe Assembler)**
  - Data Structure and Algorithm
  - C Programming Language
  - Object-oriented Programming (Java)
  - Operating System
  - Principles of Database
  - Computer Network
  - Algorithm Analysis and Design
  - Principle of Compiling

- **Fundamental Courses of Enterprise Computing**
  - Large Scale Business Database (DB2 for z/OS Fundamentals)
  - Introduction to Mainframe Systems
  - Mainframe Operating System: z/OS
  - Mainframe Programming Language (COBOL)
  - Database Application Development (DB2 for z/OS Application Development)
  - Mainframe Transaction Server (CICS)
  - Software Engineering
  - LINUX Programming
  - Java Enterprise Development
  - XML and Web Service Technology
  - Object-Oriented Analysis and Design with UML

- **Advanced Courses of Enterprise Computing**
  - Database Performance Tuning (DB2 for z/OS Query Optimization and Performance Tuning)
  - Database Administration (DB2 for z/OS System Administration)
  - Mainframe System Administration
  - Case Study of Mainframe Banking Application
  - Software Testing Technology
  - Software Architecture and Design Patterns
  - Computing Services
  - Business Intelligence
  - Software Project Management
  - LINUX Systems Management
  - IT Service Management
  - SOA application developing and systems administration on small and medium-sized servers
Enterprise Computing Community - ECC 2009

Roadmap of Mainframe Technology

Foundation Courses

- Mainframe Operating System: z/OS
- DB2 for z/OS Fundamentals
- Programming Language COBOL
- Mainframe Transaction Server (CICS)

Application Courses

- DB2 for z/OS Application Development
- DB2 for z/OS Query Optimization and Performance Tuning
- Introduction to IMS (Upcoming)
- Case Study of Mainframe Banking Application

System Administration Courses

- Mainframe System Administration
  - Fundamentals of z/OS System Administration
  - Mainframe Storage Mgmt (SMS)
  - Mainframe Security Control (RACF)
- IMS System Adm (Upcoming)
- DB2 for z/OS System Administration (Upcoming)
DB2 Cores

DB2 Developer and DB2 Administrator

DB2 for z/OS System Administration
(6th semester / 2Credits / Upcoming)

DB2 for z/OS Query Optimization and Performance Tuning
(5th Semester / 2Credits / Over 20 students since 2007)

DB2 for z/OS Application Development
(4th Semester / 4Credits / Over 300 students since 2005)

DB2 for z/OS Fundamentals
(3th Semester / 2Credits / Over 70 students since 2008)
MOE-IBM Model Courses

- Introduction to Mainframe System
- DB2 for z/OS Application Development
- Case Study of Mainframe Banking Application
- Mainframe System Administration
- Software Testing Technology
Second classroom – Mainframe contest

Awarded for “Champion”, “Best Team”, “Most Creative”, etc in nationwide contests including IBM Cup and Citicup every year since 2006.

June 21 – 23, 2009
Poughkeepsie, New York
Second Classroom – Mainframe Internship

Over 100 students has been employed with mainframe related positions in the recent 3 years
International Cooperation

Sweden
- Uppsala University
- Vaxjo University

Denmark
- Copenhagen University College of Engineering
- Valencia University

Spain
- University

USA
- Kettering University

Korea
- Kyung Hee University

Irish
- Athlone Institute of Technology
Teaching DB2 for z/OS at San Jose State University

Dr. Teng Moh
Assistant Professor, School of Software Engineering
San Jose State University
The CS Dept. by the numbers

- Currently 519 undergraduates, 179 graduate students
- 125 Bachelor’s degrees, 38 Master’s degrees awarded last year
- 18 full-time faculty, with expertise in:
  - Database/data mining
  - Networking
  - Security
  - Bioinformatics
  - …To name just a few
CS Dept. Database Courses (General)

- **CS 157A**: *Introduction to Database Management Systems* (classical ER, SQL, etc.)
- **CS 157B**: *Database Management Systems II* (OO model, web-based systems, etc.)
- **CS 257**: *Database System Principles* (storage management, query optimization, etc.)
- **CS 267**: *Topics in Database Systems* (data mining, transaction management, distributed systems, etc.)
### Course Offering Pattern (General)

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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<tbody>
<tr>
<td>CS157A</td>
<td>Two sections in Fall</td>
</tr>
<tr>
<td>CS157B</td>
<td>Currently one section in Spring</td>
</tr>
<tr>
<td>CS257</td>
<td>Two sections in Spring</td>
</tr>
<tr>
<td>CS267</td>
<td>At least one section in Fall</td>
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</tbody>
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DB2 In-Depth Certificate Program with IBM Silicon Valley Lab.

- CS 185C-01: DB2 for z/OS Fundamentals
- CS 185C-02: DB2 for z/OS Application Development
- CS 185C-03: DB2 for z/OS Query Optimization and Performance Tuning
Notes

• System Administration was also contemplated as a separate course, but it is really more a zOS course than DB2

• Dept will look carefully at integrating one or more of these courses into existing database courses, thus condensing a rather long sequence for students
## Course Offering Schedule (DB2)

<table>
<thead>
<tr>
<th>Course</th>
<th>Schedule</th>
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</thead>
<tbody>
<tr>
<td>DB2 for z/OS Fundamentals</td>
<td>Every semester through Fall 2010</td>
</tr>
<tr>
<td>DB2 for z/OS Application Development</td>
<td>Spring 2009, Spring 2010</td>
</tr>
<tr>
<td>DB2 for z/OS Query Optimization and Performance Tuning</td>
<td>Fall 2008, Fall 2009, Fall 2010</td>
</tr>
</tbody>
</table>
Delivery Plan

- In class, on campus
- Course development and delivery supported by IBM/Silicon Valley Lab
- No local z/OS system: all mainframe access arranged through IBM Academic Initiative
- Still looking for funding for development & delivery of an online version of one or more of the courses
Teaching DB2 for z/OS at Marist College

Angelo Corridori
Director of Large Systems Education
Marist College

Shirley Brost
Sr. Technical Trainer, IBM
• Agenda
  – Adapting the Material
  – Comments on the materials
  – Recommendations
Adapting the Material

• Marist College adapted one of several DB2 classes for use in the online z/OS Certificate program

• DB2 Fundamentals adaptations
  – Moved notes to eliminate empty presentation slides
  – Removed animation from the presentation slides
  – Added audio to the presentation slides
  – Created quizzes for each chapter
  – Created a midterm and final exam
  – Created two hands-on exercises
  – Adapted presentations to iLearn environment
Comments on the Material

- Very thorough introduction to DB2 for z/OS
- Topics from all areas (system administration, database administration, and application development) covered
- Presentation slides were good
- Student notes had limited content and could be improved
- Some of the material was presented in too much detail, some in too little detail
- There was redundancy in some of the material
Recommendations

- Rewrite all of the student notes in a complete, informative manner
- Extract the student notes or other materials into a textbook format
- Scale the materials back to approximately 12 - 15 chapters
- Shorten the material in each chapter so it can be covered in a 60 minute (or less) presentation
- Develop hands-on lab exercises for each chapter
- Develop quiz and test bank questions
Contact information

Gene Fuh: fuh@us.ibm.com
Distinguished Engineer and Senior Development Manager, DB2 for z/OS Query Technology

Leilei Li: leilei@us.ibm.com
Development Manager, DB2 for z/OS

Jasminder Singh: singhjas@us.ibm.com
Development Manager, DB2 for z/OS