Systems and Technology Group

CELL Programming Workshop
Closing Session

27 June 2006
Cupertino, CA, USA
Cell Ecosystem Solutions Enablement

Review Schedule

Session	Time	Topics
00	8:15-8:45	Registration (Tanaz Sowdagar)
01	8:45-8:55	Welcome (Duc Vianney)
02	8:55-9:15	Cell overview (Duc Vianney)
03	9:15-10:00	Cell architecture (Duc Vianney)
	10:00-10:15	Break
04	10:15-11:00	Cell software model (Max Aguilar)
05	11:00-11:45	Cell software development environment (Max Aguilar)
06	11:45-12:00	Build cell-based partnerships with IBM (Fred Christensen)
	12:00-1:00	Lunch
07	1:00-1:45	Running your first cell program - hello world (Max Aguilar)
08	1:45-2:30	SIMD programming (Hema Reddy)
	2:30-2:45	Break
09	2:45-3:30	Cell communication - DMA and mailboxes (Hema Reddy)
10	3:30-4:15	Using the SDK sample programs - euler (Hema Reddy)
	4:00-4:15	Break
11	4:15-5:00	Cell programming tips and techniques (Hema Reddy)
12	5:00-5:30	Closing session (Duc Vianney)

Review Learning Objectives

- **At the end of this lecture you should know**
  - what makes the difference of the Cell BE Architecture
  - how to write programs that exploit the performance of the Cell BE using
    - SIMD operations
    - Mailboxes
    - DMAs
    - Application Partitioning

Cell Information Roadmap

Information looking for	Documentation
C and C++ Standard Libraries	SPU C/C++ Language Extensions, Version 2.4
Access Ordering	Cell Broadband Engine Architecture V1.6
Aliases	SPU Assembly Language Specification, Version 1.3
Audio Resample Library	Cell Broadband Engine SDK Libraries
Cache Management	Cell Broadband Engine Programming Handbook
CBEA-Specific PPE Special Purpose Registers	Cell Broadband Engine Architecture V1.4
Completion Variables	Cell Broadband Engine SDK Libraries
Composite Intrinsics	SPU C/C++ Language Extensions, Version 2.2
Conditional Variables	Cell Broadband Engine SDK Libraries
Curves and Surfaces Library	Cell Broadband Engine SDK Libraries
Data Types and Program Directives	SPU C/C++ Language Extensions, Version 2.0
Debug Format	SPU Application Binary Interface Specification, Version 1.5
DMA Transfers and Inter-Processor Communication	Cell Broadband Engine Programming Handbook
Evaluation Criteria for Performance Simulations	Performance Analysis with Mambo
Extensions to the PowerPC Architecture	Cell Broadband Engine Architecture V1.5
FFT Library	Cell Broadband Engine SDK Libraries
Floating-Point Arithmetic on the SPU	SPU C/C++ Language Extensions, Version 2.5
Game Math Library	Cell Broadband Engine SDK Libraries
Histograms	Cell Broadband Engine SDK Libraries
I/O Architecture	Cell Broadband Engine Programming Handbook

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Information looking for	Documentation
Image Library	Cell Broadband Engine SDK Libraries
Instruction Set and Instruction Syntax	SPU Assembly Language Specification, Version 1.2
Large Matrix Library	Cell Broadband Engine SDK Libraries
Logical Partitions and a Hypervisor	Cell Broadband Engine Programming Handbook
Low-Level Specific and Generic Intrinsics	SPU C/C++ Language Extensions, Version 2.1
Low-Level System Information	SPU Application Binary Interface Specification, Version 1.4
Mailboxes	Cell Broadband Engine Programming Handbook
Math Library	Cell Broadband Engine SDK Libraries
Matrix Library	Cell Broadband Engine SDK Libraries
Memory Flow Controller	Cell Broadband Engine Architecture V1.10
Memory Map	Cell Broadband Engine Programming Handbook
Memory Maps	Cell Broadband Engine Architecture V1.2
MFC Commands	Cell Broadband Engine Architecture V1.11
Multi-Precision Math Library	Cell Broadband Engine SDK Libraries
Mutexes	Cell Broadband Engine SDK Libraries
Noise LibraryPPE	Cell Broadband Engine SDK Libraries
Object Files	SPU Application Binary Interface Specification, Version 1.6
Objects, Executables, and SPE Loading	Cell Broadband Engine Programming Handbook
Oscillator Libraries	Cell Broadband Engine SDK Libraries
Overview of the Cell Broadband Engine Processor	Cell Broadband Engine Programming Handbook

Cell Information Roadmap

Information looking for	Documentation
Parallel Programming	Cell Broadband Engine Programming Handbook
Performance Data Collection and Analysis with Emitters	Performance Analysis with Mambo
Performance Instrumentation with Profile Checkpoints and Triggers	Performance Analysis with Mambo
Performance Monitoring	Cell Broadband Engine Programming Handbook
Performance Simulation and Analysis with Mambo	Performance Analysis with Mambo
Power and Thermal Management	Cell Broadband Engine Programming Handbook
PowerPC Processor Element	Cell Broadband Engine Programming Handbook
PowerPC Processor Element	Cell Broadband Engine Architecture V1.8
PPE Interrupts	Cell Broadband Engine Programming Handbook
PPE Multithreading	Cell Broadband Engine Programming Handbook
PPE Oscillator Subroutines	Cell Broadband Engine SDK Libraries
PPE Serviced SPE C Library Functions	Cell Broadband Engine SDK Libraries
Privileged Mode Environment	Cell Broadband Engine Architecture V1.1
Problem State Memory-Mapped Registers	Cell Broadband Engine Architecture V1.12
Program Loading and Dynamic Linking	SPU Application Binary Interface Specification, Version 1.7
Resource Allocation Management	Cell Broadband Engine Programming Handbook
Shared-Storage Synchronization	Cell Broadband Engine Programming Handbook
Signal Notification	Cell Broadband Engine Programming Handbook
SIMD Programming	Cell Broadband Engine Programming Handbook
Simulation Library	Cell Broadband Engine SDK Libraries

Cell Information Roadmap

Information looking for	Documentation
SPE Channel and Related MMIO Interface	Cell Broadband Engine Programming Handbook
SPE Context Switching	Cell Broadband Engine Programming Handbook
SPE Events	Cell Broadband Engine Programming Handbook
SPE Local Storage Memory Allocation	Cell Broadband Engine SDK Libraries
SPE Oscillator Subroutines	Cell Broadband Engine SDK Libraries
SPE Programming Tips	Cell Broadband Engine Programming Handbook
SPE Serviced C Library Functions	Cell Broadband Engine SDK Libraries
SPU and Vector Multimedia Extension Intrinsics	SPU C/C++ Language Extensions, Version 2.3
SPU Application Binary Interface	SPU Application Binary Interface Specification, Version 1.3
SPU Architectural Overview	SPU Architectural Overview
SPU Channel Instructions	SPU Architectural Overview
SPU Channel Map	Cell Broadband Engine Architecture V1.3
SPU Compare, Branch, and Halt Instructions	SPU Architectural Overview
SPU Constant-Formation Instructions	SPU Architectural Overview
SPU Control Instructions	SPU Architectural Overview
SPU Floating-Point Instructions	SPU Architectural Overview
SPU Hint-for-Branch Instructions	SPU Architectural Overview
SPU Integer and Logical Instructions	SPU Architectural Overview
SPU Interrupt Facility	SPU Architectural Overview
SPU Isolation Facility	Cell Broadband Engine Architecture V1.15

Cell Information Roadmap

Information looking for	Documentation
SPU Memory - Load/Store Instructions	SPU Architectural Overview
SPU Performance Evaluation	Performance Analysis with Mambo
SPU Performance Evaluation Criteria and Statistics	Performance Analysis with Mambo
SPU Rotate and Mask	SPU Architectural Overview
SPU Shift and Rotate Instructions	SPU Architectural Overview
SPU Synchronization and Ordering	SPU Architectural Overview
Storage Access Ordering	Cell Broadband Engine Architecture V1.14
Storage Models	Cell Broadband Engine Architecture V1.7
Sync Library	Cell Broadband Engine SDK Libraries
Synergistic Processor Elements	Cell Broadband Engine Programming Handbook
Synergistic Processor Unit	Cell Broadband Engine Architecture V1.9
Synergistic Processor Unit Channels	Cell Broadband Engine Architecture V1.13
Time Base and Decrementers	Cell Broadband Engine Programming Handbook
User Mode Environment	Cell Broadband Engine Architecture V1.0
Vector Library	Cell Broadband Engine SDK Libraries
Vector/SIMD Multimedia Extension and SPU Programming	Cell Broadband Engine Programming Handbook
Virtual Storage Environment	Cell Broadband Engine Programming Handbook

What is next

- **Access to a cell blade center – Fred Christensen**
- **Getting a system loaner – Fred Christensen**
- **Further questions**
  - Duc Vianney dvianney@us.ibm.com
  - Hema Reddy hemlata@us.ibm.com
  - Max Aguilar maguilar@us.ibm.com
  - Fred Christensen christen@us.ibm.com

Future Cell workshop schedule

For details, see

https://www-304.ibm.com/jct09002c/isv/spc/events/cbea.html

Date	Location
Jun 27	Cupertino, USA
Jul 24-25	Toronto, Canada
Jul 26-27	Stuttgart, Germany
Aug 15-16	Chicago, USA
Aug 22-23	Waltham, USA
Aug 29-30	Bangalore, India
Sep 4-5	Austin, USA
Sep 12-13	Shanghai, China
Sep 19-20	Dallas, USA
Oct 2-3	Paris, France
Oct 5-6	Hursley, UK
Oct 30-31	Austin, USA
Nov 7-8	San Mateo, USA
Nov 21-22	Sydney, Australia

Feedback – Let us hear what you think!

- **Any more questions ?**
- **Please give us some thoughts on the course**
  - Expectations, Ideas for improvement, Things to discuss, Suggestions, …

Thank you!

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