sections details

presentation

DAD – Distributed Applications Development

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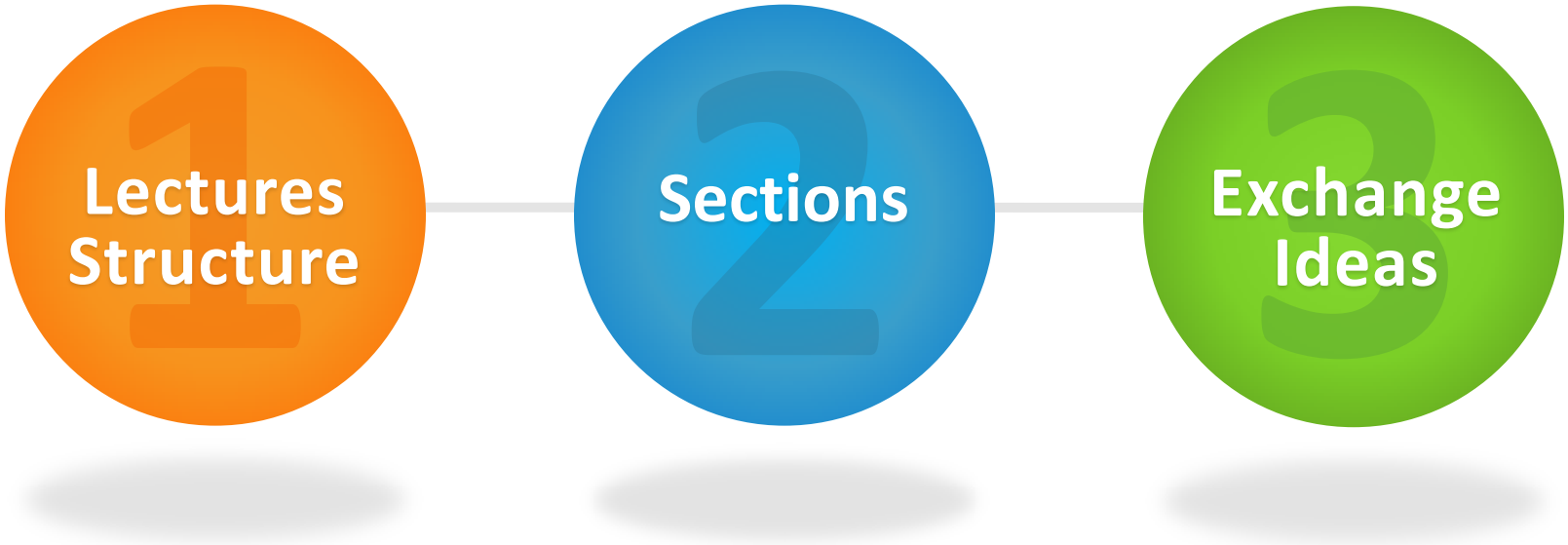
Cristian Toma – Business Card

Agenda for DAD



DAD Administrative issues, Mission, Target Group Profile

DAD Lectures Structure

1.1 DAD Lectures Structure

Main issues:

Didactic Activities: Lectures 50% + Lab / Seminar 50%
14 meetings **14 meetings**

Evaluation: PC Exam – 60% / Seminars tests & assignments – 40%

E-Framework: VMs – VM-Ware Virtual Machines with:

- Linux Ubuntu 12 LTS + JDK 6 + Eclipse Indigo + Netbeans + Apache Tomcat + JBOSS + GCC
- Linux Ubuntu 8 + JDK 6 + Apache Hadoop 0.18
- Red Hat Linux + GCC + JDK6 + Globus Toolkit + Condor

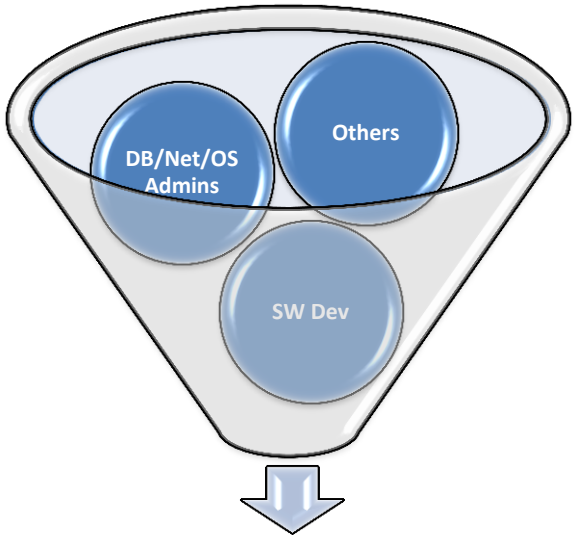
E-Learning Platform: SAKAI – http://ism.ase.ro - http://acs.ase.ro

Prerequisites: Fundamentals of Java 6 SE + C/C++ '11 + Networking + Linux/Windows OS | Optional – Ruby & Python

Mission: Technological transfer from university to the students of practical and theoretical issues related with distributed applications development.

1.2 Target Group Profile

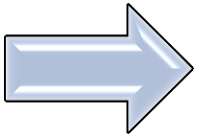
DAD – Distributed Applications Development

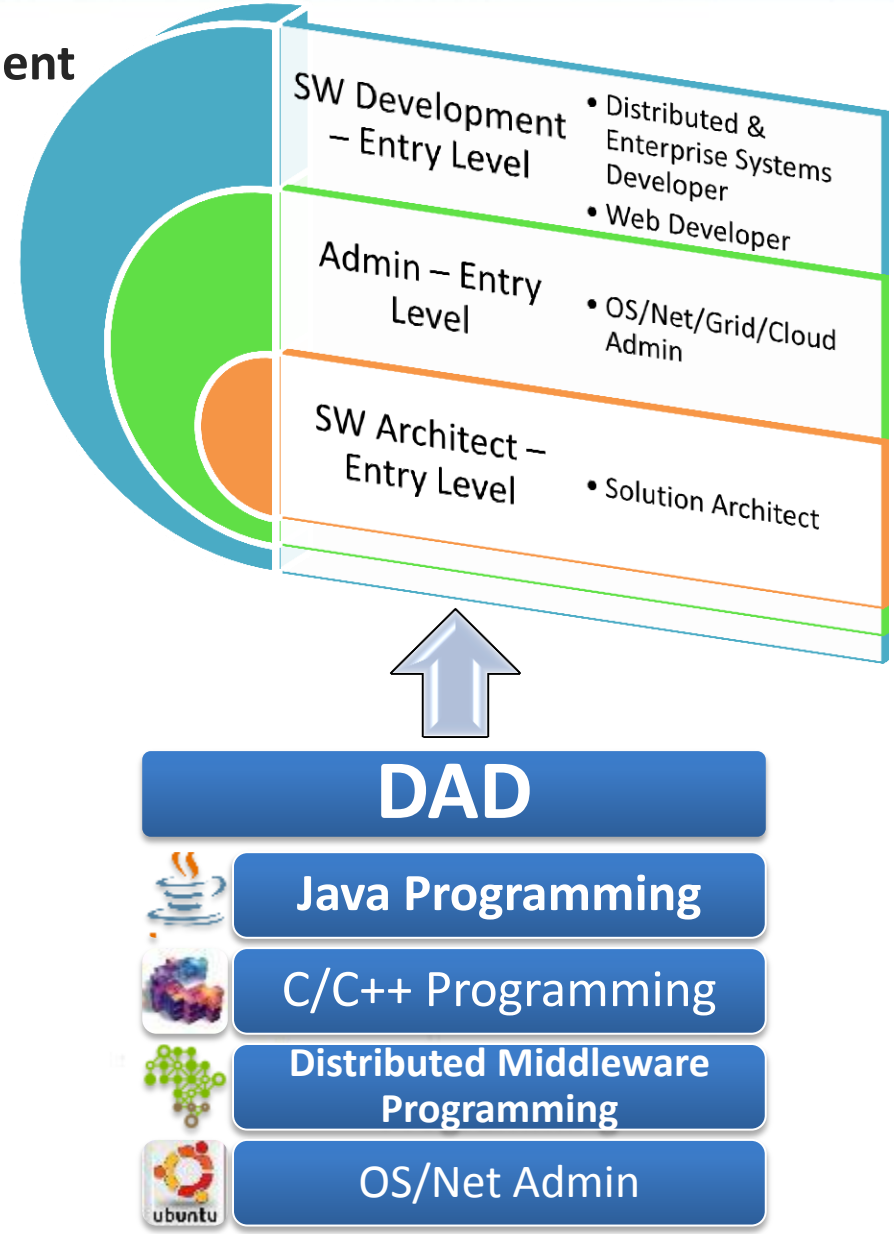


DAD needs students with

C/C++, C#, Java, Networking, OS

Knowledge of Fundamentals





Sections – OOP, Networking, Web Dev, Core Middleware Dev, Distributed Solutions Dev

DAD Sections & References

It’s not just about the programming, but providing smart solutions

DAD Sections & References

What about the DAD as it is @ Harvard/MIT?

Could you provide a solution for finding out the biggest mark in the class?

Do we have unicast, multicast, broadcast messages or client-server, P2P / hybrid paradigms?…GREAT...Please upload the solution in Java / C# / C/C++ / Python / Ruby till next week 23:50 in e-learning platform – SAKAI…I'm NOT kidding…

2.1 DAD Sections

Section I – Summary of JSE for Distributed and Parallel Computing

Section II – Summary of Network Protocols Programming in JSE for Distributed Systems

Section III – Summary of Web Development in JEE

Section IV – Core Distributed MiddleWare Programming in JEE

Section V – Distributed Systems for Distributed & Parallel Computing

2.1 DAD Sections

I. Summary of JSE for Distributed and Parallel Computing

1. Java Annotations & Java Reflection
2. Java Generics & Java Collection Framework
3. I/O Stream & Java Libraries & JNI – Java Native Interface
4. Exceptions + Singleton classes & factory methods
5. JVM issues, processes & Multi-threading in JSE and C/C++ Linux vs. IPC and VM threading features
6. Parallelism Intro – Win7/Linux –Multi-threading, OpenMP, OpenMPI vs. OpenCL – Intel and nVidia providers or native nVidia CUDA

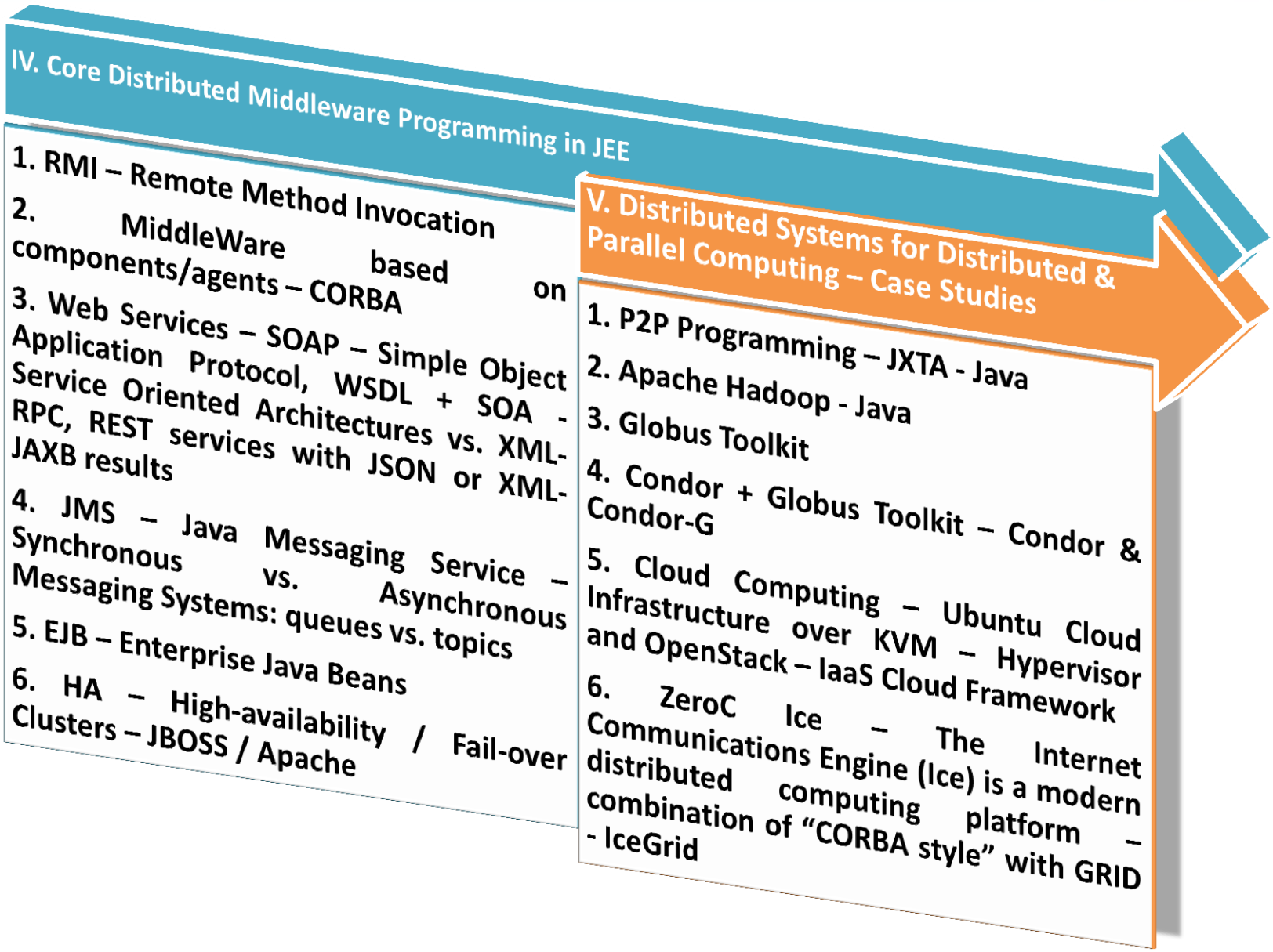
II. Summary of Network Protocols Programming in JSE for Distributed Systems

1. TCP – Transmission Control Protocol - RFC 793
2. UDP – User Datagram Protocol - RFC 768
3. HTTP – HyperText Transport Protocol - RFC 2616
4. FTP – File Transport Protocol - RFC 959
5. SMTP – Simple Mail Transport Protocol - RFC 821, POP3 – Post Office Protocol - RFC 1939 & RFC 2449, IMAP4 – Internet Message Access Protocol - RFC 1730 & RFC 3501
6. SNMP – Simple Networking Management Protocol - RFC 1157
7. RMI/RPC – Remote Method - RFC 1050 & RFC 1057 / RFC 2713
8. ARP/RARP, ICMP, LDAP, DNS, DHCP

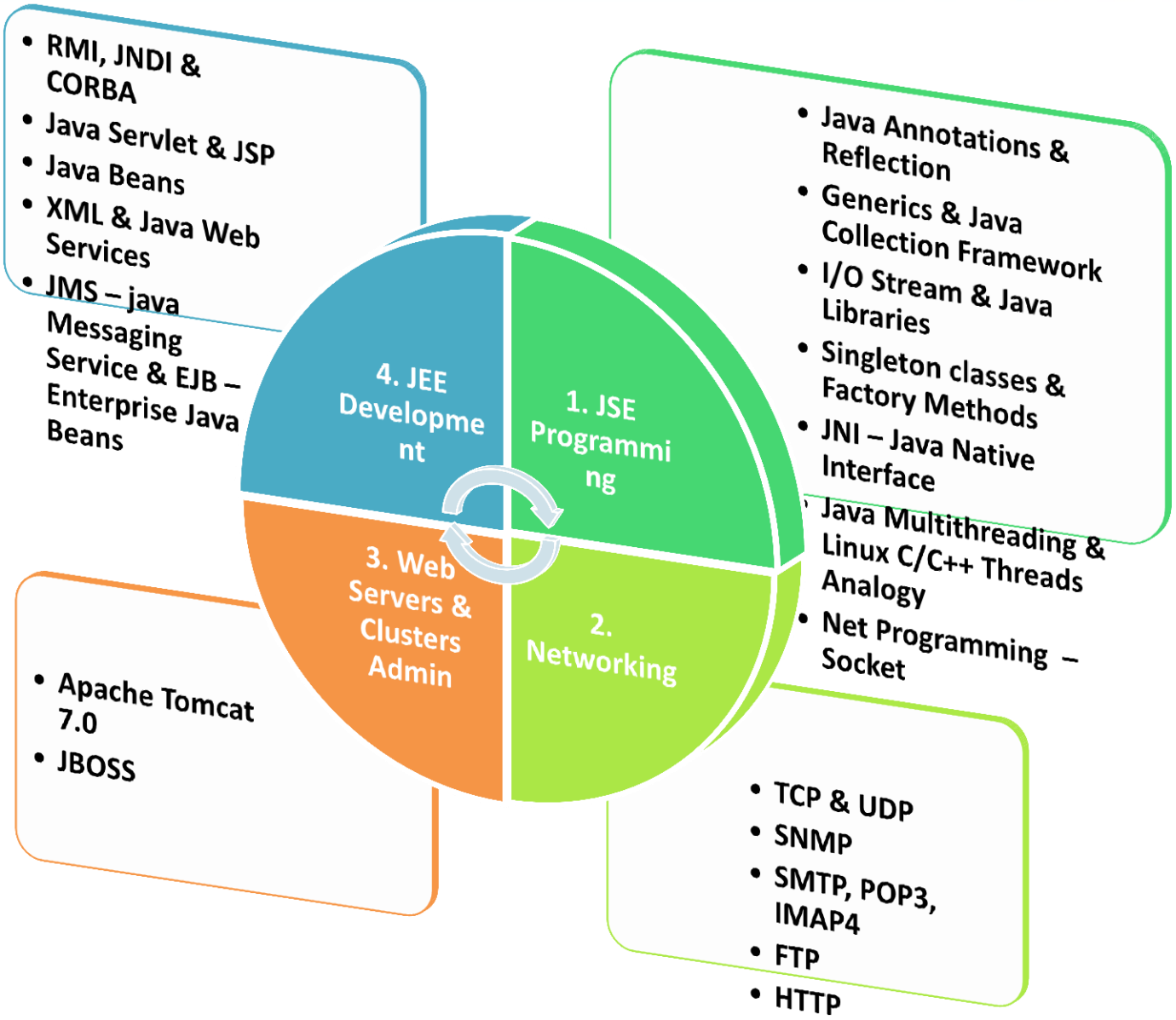
III. Summary of Web Development in JEE

1. JNDI – Java Naming Directory Interface
2. XML DOM & SAX / JAXB vs. JSON – optional
3. JDBC – Java Database Connectivity – optional
4. Java Servlet – Intro
5. JSP – Java Server Pages & Taglibs
6. Java Beans & Mail
7. HTTP trafic analysis for JSP & Servlet
8. MVC: Spring vs Struts vs JSF – Optional
9. Portlets-WSRP & BMP/BPEL vs. Rules Engine – Optional

2.1 DAD Sections



2.2 Mission & Goals Items for Basis using Java



2.3 References

1. George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, "***Distributed Systems: Concepts and Design***", Publisher Addison-Wesley; 5 edition (April 27, 2011), ISBN-10: 0132143011, ISBN-13: 978-0132143011
2. Andrew S. Tanenbaum, Maarten Van Steen, "***Distributed Systems: Principles and Paradigms (2nd Edition)***", Publisher Prentice Hall; 2 edition (October 12, 2006), ISBN-10: 0132392275, ISBN-13: 978-0132392273
3. **My Experience** and lectures/labs slides presentations, examples, virtual machines + your visual, kinetic and auditory memory + SAKAI e-Learning System PROVIDED by **ISM – IT&C Security Master** Program - https://86.55.177.71:7443) + http://ism.ase.ro / http://acs.ase.ro

Section I – Summary of JSE for Distributed and Parallel Computing

1. http://java.sun.com
2. http://www.oracle.com/technetwork/java/index.html
3. http://www.oracle.com/technetwork/index.html
4. http://docs.oracle.com/javase/tutorial/

Section II – Summary of Network Protocols Programming in JSE for Distributed Systems

1. http://docs.oracle.com/javase/tutorial/networking/TOC.html
2. RFC 793, RFC 768, RFC 2616, RFC 1945, RFC 959, RFC 821, RFC 1939, RFC 2449, RFC 1730, RFC 3501, RFC 1157, RFC 1050, RFC 1057, RFC 2713
3. TCP/IP Red Book – IBM Press
4. Andrew S. Tanenbaum, *"Computer Networks"*, Fourth Edition, Prentice Hall Publishing House, ISBN 0-13-066102-3, 2003

2.3 References

Section III – Summary of Web Development in JEE

1. **http://www.jboss.org/developer/tutorials.html**
2. **http://docs.oracle.com/javaee/6/tutorial/doc/**

Section IV – Core Distributed MiddleWare Programming in JEE

1. http://docs.oracle.com/javase/tutorial/

RMI:

2. http://docs.oracle.com/javase/tutorial/rmi/index.html

CORBA:

3. http://docs.oracle.com/javase/1.4.2/docs/guide/idl/GShome.html
4. http://docs.oracle.com/javase/1.4.2/docs/guide/idl/jidlDistApp.html

XML & Web Services:

5. http://docs.oracle.com/javase/tutorial/jaxp/index.html
6. http://docs.oracle.com/javase/tutorial/jaxb/index.html
7. http://docs.oracle.com/cd/E17802_01/webservices/webservices/docs/1.6/tutorial/doc/index.html

JMS & EJB:

8. http://docs.oracle.com/javaee/1.3/jms/tutorial/
9. http://docs.oracle.com/javaee/6/tutorial/doc/bncdq.html
9. http://docs.jboss.org/ejb3/app-server/tutorial/
10. http://www.jboss.org/ejb3/docs

2.3 References

Section V – **Distributed Systems for Distributed & Parallel Computing**

1. P2P – JXTA - http://jxta.kenai.com/ + http://java.net/projects/jxta + http://download.java.net/jxta/jxta-jxse/2.5/

2. Apache Hadoop - http://hadoop.apache.org/

3. Globus Tookit - http://www.globus.org/toolkit/

4. Condor - http://research.cs.wisc.edu/condor/

5. ZeroC Ice - http://www.zeroc.com/

High Performance Computing Training – HPC combined with HTC:

https://computing.llnl.gov/?set=training&page=index#training_materials

HTC = High Throughput Computing

HPC = High Performance Computing

Extra-ReadMe

HA Clusters & Cloud Computing – Ubuntu Cloud Infrastructure

http://en.wikipedia.org/wiki/High-availability_cluster

Hypervisor-KVM + OpenStack - IaaS Cloud:

https://help.ubuntu.com/community/UbuntuCloudInfrastructure

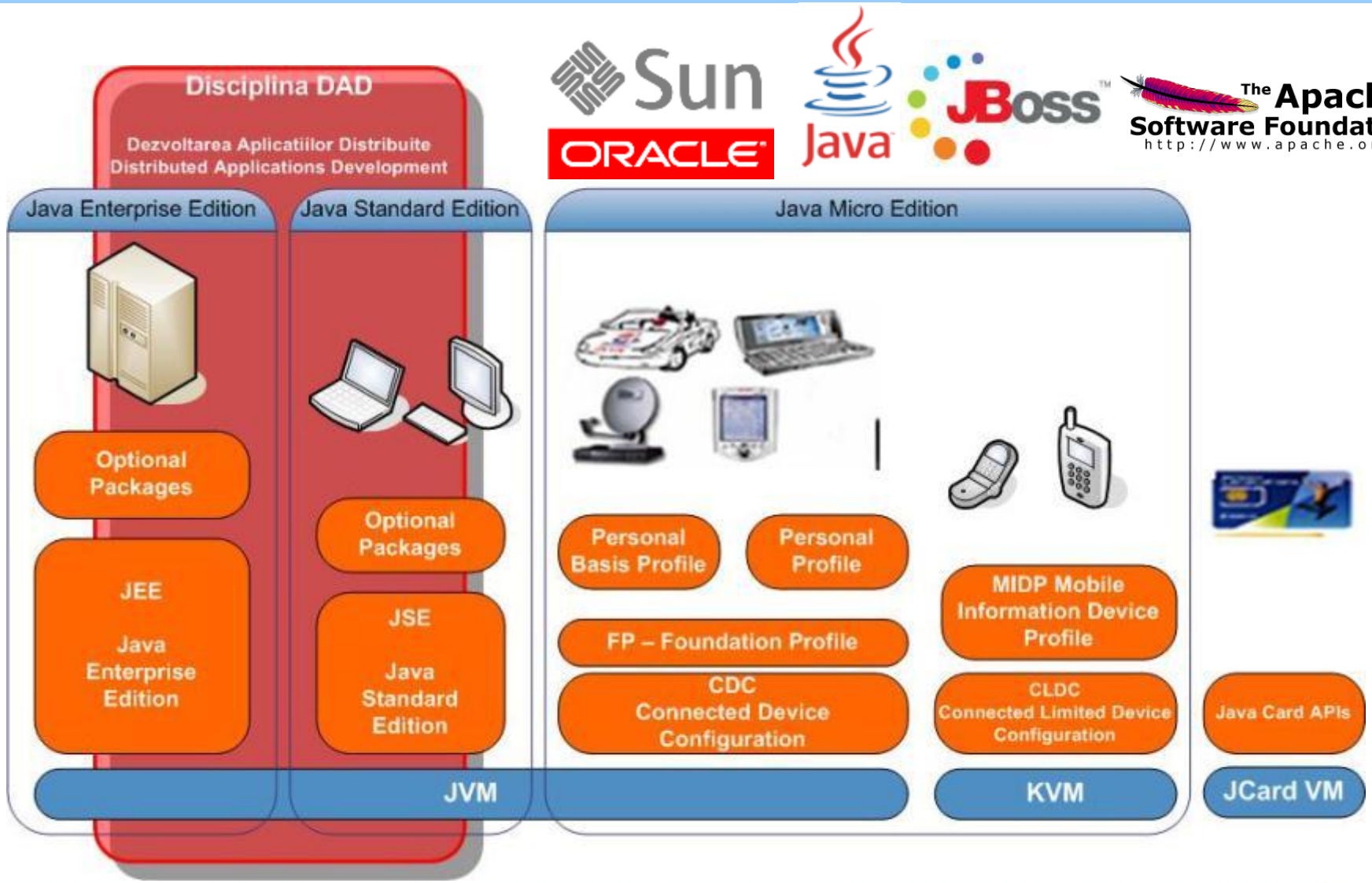
http://www.openstack.org/

http://www.openstack.org/software/start/

Embedded Distributed Systems

http://www.cl.cam.ac.uk/freshers/raspberrypi/tutorials/distributed-computing/ - demo in Python

JSE 25% + JEE 30% + C/C++ 15% + OS Admin 10% + Distributed Solutions 20%

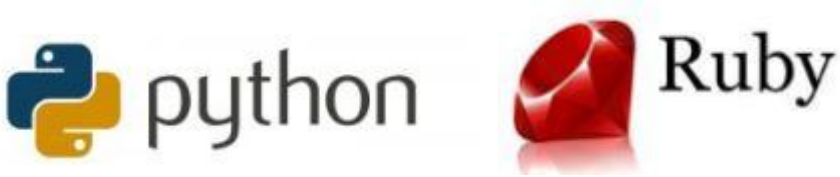


Recommended Languages, OS & Technologies

OS & Virtualization

Programming Languages

Interpreted Languages



HPC – High Performance Computing / Parallel Computing
Frameworks & Languages – C/C++ "flavors"

Open MPI:
Open Source
HPC

Recommended Languages & Technologies for HTC

HTC – High Throughput Computing Frameworks based on C/C++/Java

Java P2P

Java Map-Reduce

Java & C/C++ for GRID

C/C++ for GRID & HTC

ZeroC ICE – Java, C++, C# .NET Internet Communications Engine + GRID

Recommended Open IaaS Clouds

Open IaaS – Infrastructure as a Service Cloud

openstack™
CLOUD SOFTWARE

http://www.openstack.org

EUCALYPTUS

http://www.eucalyptus.com

OpenNebula.org
The Open Source Solution for Data Center Virtualization

http://www.opennebula.org

DAD Issues Summary
for easy sharing

Section Conclusions

DAD – Distributed Applications Development

Technological Transfer from UNI2Student

Main Technologies

- IPC Linux + Multi-threading
- Java Standard Edition
- Java Enterprise Edition
- Core Distributed Middleware
  - RMI
  - CORBA
  - SOA – Web Services
  - JMS, EJB
- Distributed Systems for Parallel & Distributed Computing – Case Studies:
  - Apache Hadoop
  - Condor

Share knowledge, Empowering Minds

Communicate & Exchange Ideas

SHARE IT

» Show and tell our **KNOWLEDGE**

» Share and realize **IT&C Technological Transfer**

» CREATE together **Distributed Application Development Entry-Level Support - AWERNESS**!

Questions & Answers!

But wait…

There's More!

1. **DAD - Is what you expected?**
2. **How many hours per week are you going to invest in order to achieve DAD goals?**
3. **How many of you are working in IT field – SW Dev., Admin., Designers?**
4. **What bachelor programs are you graduated from?**
5. **How many students get the payment scholarship from the companies vs. how many are/aren't paying the studies?**
6. **In what disciplines did we collaborate together?**

Thanks!