# Microsoft Research – Windows Azure for Research Training

## Agenda

**Day 1**

|  |  |
| --- | --- |
| 09:00 | 0. Welcome and Logistics |
| 09:15 | 1. Windows Azure Websites Lab |
| 10:00 | Break |
| 10:15 | 1. Introduction to Windows Azure |
| 10:30 | 3.a. Windows Azure Virtual Machines Lab |
| 11:30 | 3.b. Virtual Machines Applications Lab |
| 12:00 | Lunch and Group Discussions |
| 01:00 | 1. Windows Azure Storage Lab |
| 02:30 | Break |
| 02:45 | 1. Understanding and Consuming Cloud services |
| 03:45 | 1. Excel and Data Visualization |
| 04:30 | 1. Big Data analytics using Hadoop and SQL and no-SQL |
| 05:00 | Discussion |
| 05:15 | Day 1 Concludes |

**Prerequisites:**

* List of requisite software including get two browsers, Azure Explorer, Cygwin, etc.
* course content Pre-downloaded including Scripts, Data, and Code
* Instructions for installing CLI, Azure SDK on computer with pointers to technical papers.

**Agenda: Day 1**

Learning objectives – what you will learn:

* Windows Azure Overview
* Windows Azure Websites
* Windows Azure VMs
* Windows Azure Storage
* Windows Azure Cloud Services
* Windows Azure – Data Analytics

Examples for research scientists

Outline of Use Scenarios and Design Patterns for researchers (Day 1).

* VM: A Work environment in the cloud
* Manual workstation burst, R, MATLAB
* Blog Storage: Store and share your Data in the Cloud
* Use persistent queue and table to scale embarrassingly parallel workload
* Publish Simulations in the Cloud

1. 09:00 Welcome 20 minutes, accounts logistics.
2. 9:15 Windows Azure Website intro. – Hands on Lab

Learning objectives for this hour: understanding how azure can make some tasks extremely easy.

* How to create a simple blog site using Windows Azure
* An example using the Django (a Python framework), and Bing Maps

1. 10:15 Introduction to Windows Azure (brief 15 min overview and point to online slides)

* Learning objectives for this hour: understanding the basics of cloud computing with Azure
* Patterns and terminology – IaaS, PaaS, SaaS
* Windows Azure basics
  + - Virtual machines
    - Web sites
    - Cloud services
    - Building blocks for applications – storage, messaging, identity, etc.
* Cloud patterns for research scientists

3.a. 10:30 Windows Azure Virtual Machine – Hands on Lab

Learning objectives: How to create virtual machines using Windows Azure

* The wide variety of pre-configured virtual machines available from the gallery
* How to make your own virtual machine from an existing installation
* An example using Windows and Visual Studio
* An example using Linux and IPython notebook

Class activity:

Start fetching the class Linux VM from the VM Depot. This has pre-installed tools, IPython notebook pre-configured, run command to start at port 8080 private public 443.

3.b. 11:30 Windows Azure Virtual Machine Applications – Hands on Lab

Learning objectives for this lab:

* Further exploration of Python tools typically used in scientific applications, e.g. clustering with Pandas and Scikit-learn
* Demo: How to install and use R and MATLAB in Windows Azure.
* More advanced and realistic examples of using Windows Azure for research purposes

Lab details

* 1. Deploy the Windows Visual Studio VM.
  2. Deploy the class Linux VM and bring up IPython.
  3. Run through data clustering, pandas, and other scientific examples [1 hour] Clustering, Pandas.
  4. Attach Disks exercise.

**12:00 Lunch and discussions**

1. 1:00 Windows Azure Storage – Hands on Lab
   1. Introduction to storage concepts (20 min)
   2. Azure explorer, Cerebrata tools.
   3. [Python] mostly. Reuse their existing IPython notebook to try out the storage Commands in Linux console CLI.
   4. Learn to use AzCopy (Windows VM).

**02:30 break**

1. 2:45 Understanding and Consuming Cloud Services with Weather demo, Blast demo.  <http://blaster.cloudapp.net/>

Learning objectives: the architecture of a multitier cloud service

* Cloud services basics
* Core concepts:
  + - Web roles
    - Worker roles
* Combining web roles and worker roles to make cloud services
* Service bus queues
* An example cloud service consumption
* Cloud services for research application

Discussion and Lab

* + Introduction to Cloud Services.
  + Introduction to Service Bus Queues.
  + Explain: How to take an existing binary exe, using persistent SB Queue, and Table storage for scale out.

Lab

* Using the existing Linux VM: Run a Python Service Bus client with Blast worker. The lab will ask students to join the class blast cluster by adding a service bus key, create a new topic and run python.exe worker.py.  Call Send () Receive () message. Then, submit jobs through the blaster.cloudapp.net portal

1. 3:45 Excel and Data Visualization (demo from data market, azure, power tools) and Layerscape

Learning objective design patterns

* Designing data analysis services that can be viewed from Excel or the browser

1. 04:30 Big Data analytics using Hadoop with HDInsight, HDP and SQL and no-SQL – talk and point to online materials

Learning objectives: A deeper understanding of how MapReduce is used on data analytics

* Big data analytics using HD Insight and Hortonworks HDP
* Azure SQL and no-SQL concepts.
* Examples of when this is useful for research scientists

**05:00 Conclusion and discussions.**

1. 05:15 End of Day1.

## End of document