

How to Cloud: Interacting with Azure

for the MSU Cloud Fellowship

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Introduction

This is an abbreviated introduction to cloud, virtualization concepts, and the Azure portal

The goal is to have enough conceptual background for a workshop session creating a Virtual Machine in Azure

You may have to install remote desktop software: which you do now or as we start the workshop

*MacOS : install the Microsoft Remote Desktop Client, only available on the App Store:
<https://apps.apple.com/app/microsoft-remote-desktop/id1295203466?mt=12>*

Linux users install <http://xrdp.org/>

Windows Users ensure you have the client : In the search box on the taskbar, type Remote Desktop Connection, and then select Remote Desktop Connection.



Important Terms for Today

Resource = "entity you can interact with" = something you can order, and change. For example, at a restaurant you can't order a new table, that's part of the environment and can't be changed, but you could ask for a new fork if yours is dirty.

Interface = the means by which interact with resources There are multiple ways to put in your cloud order, and we'll use the Web Interface today

Virtualization = described below



Review: what is cloud computing?

NIST Definition <https://csrc.nist.gov/publications/detail/sp/800-145/final>

On-demand self-service : *computing resources can be created from software*

Broad network access

Resource pooling

Rapid elasticity

Measured service : *fee-for-service model, because it is metered*

Background: how does this all actually work?

The fact that "resources" can be created automatically with software is the key:

- phone systems used to be manually switched but change to electronic and now digital switching
- in 90s computer networks used to be all wires. *creating a secure route -> new router and wires.*
- Now we use software defined networks *programmable network-> "virtual" routes on-demand*



This all can work because 'virtualized' hardware can be created and controlled with software

Add user accounts, metering, and a billing system and you can start charging for usage

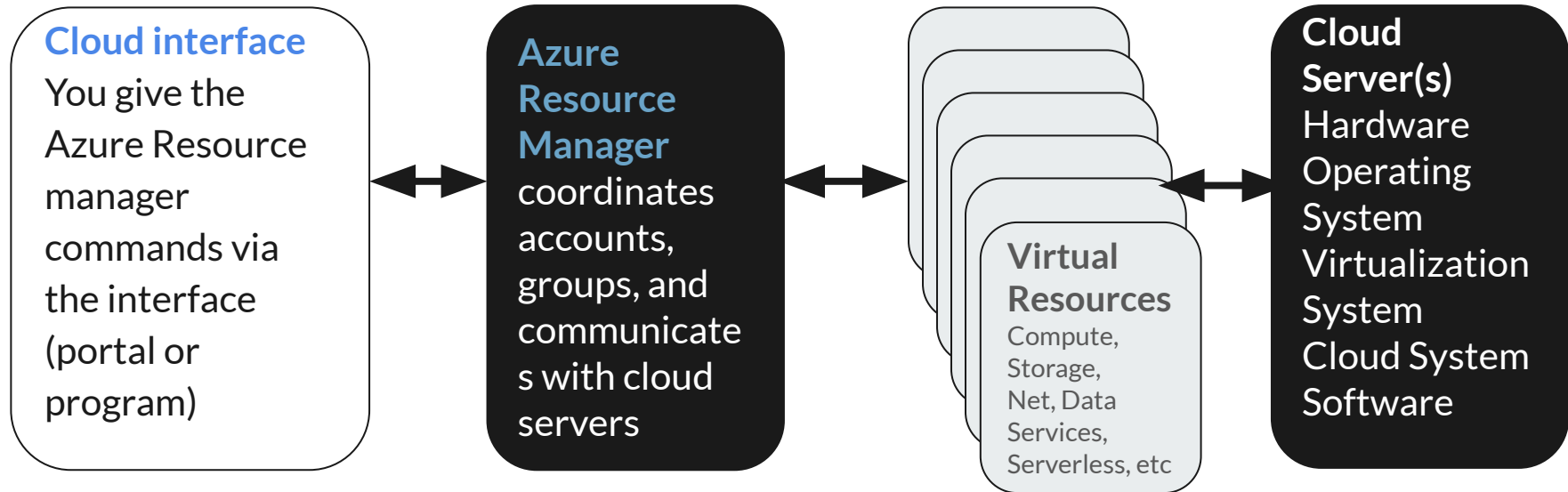
Metered, Pay-per-use computing system

Unlike the cloud...

- Requires physical presence
- time limited
- one person per machine
- you are not continued to be charged when you stop playing
- high scores not a CV builder



Over-simplified Cloud System Components



The dark-background components are invisible to you as the user. You see the interface, and the resources created by the resource manager you create.

The key is that virtualized hardware resources can be managed completely with a software layer



What is a Cloud Resource?

A very abstract, generic concept of Anything you can control (manage) with Azure cloud Apparently it's a cube



It's a thing that has properties you can set. Example here is a 'storage account' which has several properties to control how it works.

The screenshot is of the Azure portal and the over view page.

The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and navigation icons. The main content area displays the 'Overview' page for a storage account named 'cf21billspatstorage'. The left sidebar contains navigation options like 'Overview', 'Activity log', 'Tags', 'Diagnose and solve problems', 'Access Control (IAM)', 'Data migration', 'Events', 'Storage Explorer (preview)', 'Data storage', 'Containers', 'File shares', 'Queues', 'Tables', and 'Security + networking'. The main content area shows a list of properties for the storage account, including Resource group, Location, Primary/Secondary Location, Subscription, Subscription ID, and Disk state. Below the properties, there are tabs for 'Properties', 'Monitoring', 'Capabilities (7)', 'Recommendations', 'Tutorials', and 'Developer Tools'. The 'Properties' tab is active, showing details for 'Blob service' and 'Security'.

Property	Value
Resource group (change)	cf21group_billspat
Location	East US
Primary/Secondary Location	Primary: East US, Secondary: West US
Subscription (change)	Cloud Fellowship
Subscription ID	047e742e-cb26-41e6-a9d6-9d42c67f43e6
Disk state	Primary: Available, Secondary: Available
Performance/Access tier	Standard/Hot
Replication	Read-access geo-redundant storage (RA-GRS)
Account kind	StorageV2 (general purpose v2)
Provisioning state	Succeeded
Created	9/3/2021, 3:29:34 PM

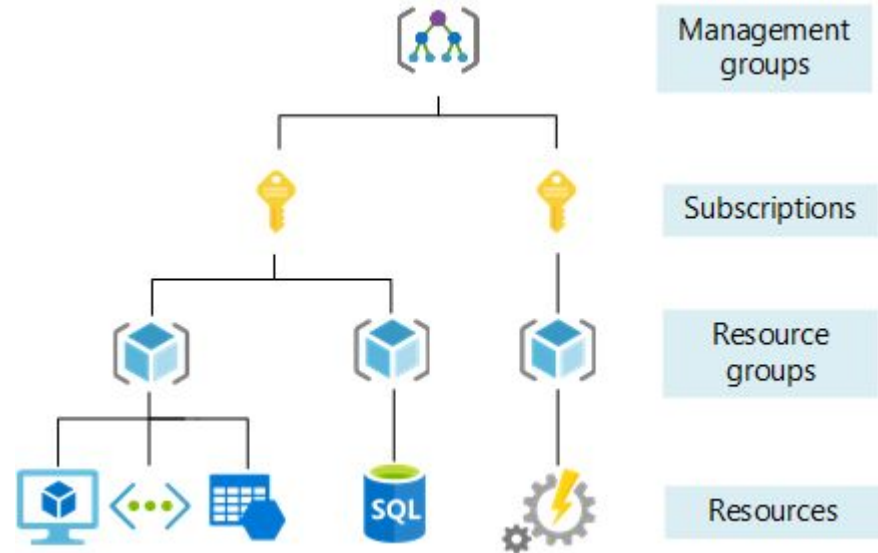
Azure Management Organization

Cloud Fellowship document:

<https://msucloudfellowship.github.io/session-how-to-cloud/azure-organization/>

Azure Documentation:

[Organize your Cloud Resources](#)





Using The Azure Portal to create resources

- Reading, tutorial and video on the website
[https://msucloudfellowship.github.io/session how to cloud/azure portal walkthrou gh](https://msucloudfellowship.github.io/session%20how%20to%20cloud/azure%20portal%20walkthrough)
- Example portal activity: creating a cost/budget alert :
[https://msucloudfellowship.github.io/session introduction/cost alert.md](https://msucloudfellowship.github.io/session%20introduction/cost%20alert.md)

What is a Virtual Machine? (VM)

Like a network can be made "virtual" an entire computer hardware system can be created with software, so that when you install an operating system (windows, Linux), the operating system thinks it's inside an actual computer.

You can do this on your own laptop with software from <https://www.virtualbox.org/>

The implementation is not important. (Hypervisor, etc)

The importance is that you can create new virtual "computers" at any time using software

The "disk" of the virtual machine is just another (very large) file so when the virtual computer saves data, it's saved inside the virtual disk, and you can re-use the disk and restart the "virtual computer"



*windows 10 VM guest on a MacOS
host: computer in a box*



Components of a VM

- **VM Management Software**
- **CPU** = the virtual computer itself
- **Memory** = a portion of the host computer's memory.
- **Disk** The operating system and software installed on this disk (the "OS Disk")
- **Network Interface** a virtual network card, e.g. a wifi on your laptop,
- **Virtual Network** to connect it to the rest of the world and to secure it
- **Operating System and Software** pre-installed and/or after creation



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- **Disk** The operating system and software installed on this disk (the "OS Disk")
- **Network Interface** a virtual network card, e.g. a wifi on your laptop,
- **Address** a means to find the computer in the network
- **Virtual Network** to connect it to the rest of the world and to secure it
- **A data disk** : an optional second virtual disk to just store data
- **Operating System and Software** pre-installed and/or after creation

*Which of these things would be "resources" in Azure?
(an entity you can work with)*