



CLOUD BASICS FOR RESEARCH COMPUTING

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IRENE KOPALIANI, PHD, CISA, CISM
IK8@PRINCETON.EDU

AGENDA

- Types of Cloud
- Why use Cloud
- Public Cloud Adoption
- Pros/Cons of largest Hyperscale Providers
- Security Misconceptions
- Cloud Spend Waste
- Strategies for Cost Reduction
- Automation Example
- Resources – links to calculators

Attendance

<http://cglink.me/2gi/c1340947101281936>

- Logging in
- Overview of the environment – dashboards, menus
- Creating Resource Groups & Tags
- Adding new services
- Creating Virtual Machines & Network Security Groups
- Storage Options
- Deleting Resource Groups
- Getting Help

TYPES OF CLOUDS



Private



Public



Multi Cloud



Specialty
Cloud



Hybrid

Reduced cost

1

2

Flexibility

Scalability

3

4

Built-in backup plan

Technology options

5

6

Collaboration



76%

12%

5%



69%

18%

5%



34%

26%

12%



20%

14%

11%



15%

15%

9%



7%

13%

8%



AWS

Pros

- Market leader for 10 years
- Massive Scope of operations
- Comprehensive Global Network

Cons

- Cost Structure
- Support Fees
- Overwhelming implementation choices



AZURE

Pros

- Tight Microsoft products integration
- Built on the existing customer base

Cons

- Customer support issues
- Partner ecosystem



GCP

Pros

- Strong Offer in Container
- Specializes in High compute offerings
- Strong AI/ML capabilities

Cons

- Limited Offerings
- Limited Global Data Centers
- Secondary provider, not a strategic provider



Google
Cloud Platform

SECURITY MISCONCEPTIONS



Troubling Statistics

75%

Moving data
to the cloud

1/2

Expect security
breaches

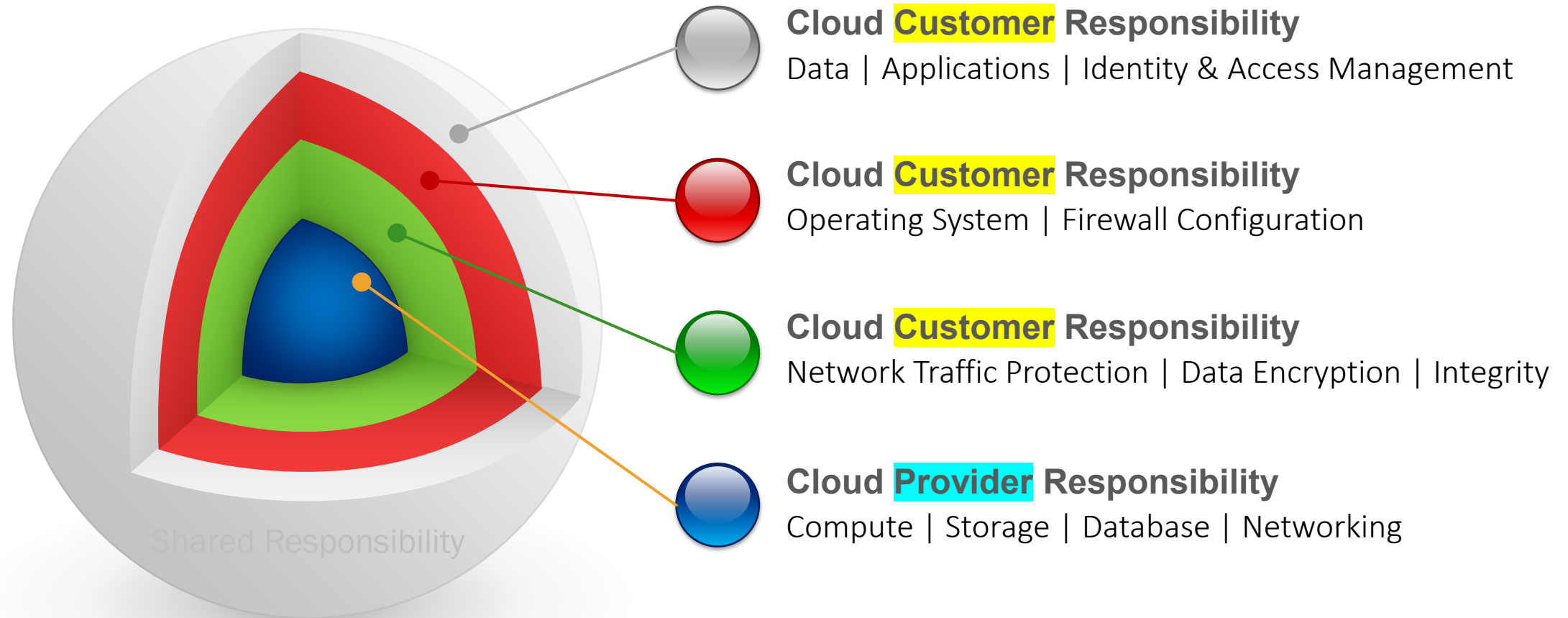
57%

Think security
is cloud provider's
responsibility



So, what happens when you move into a public cloud?

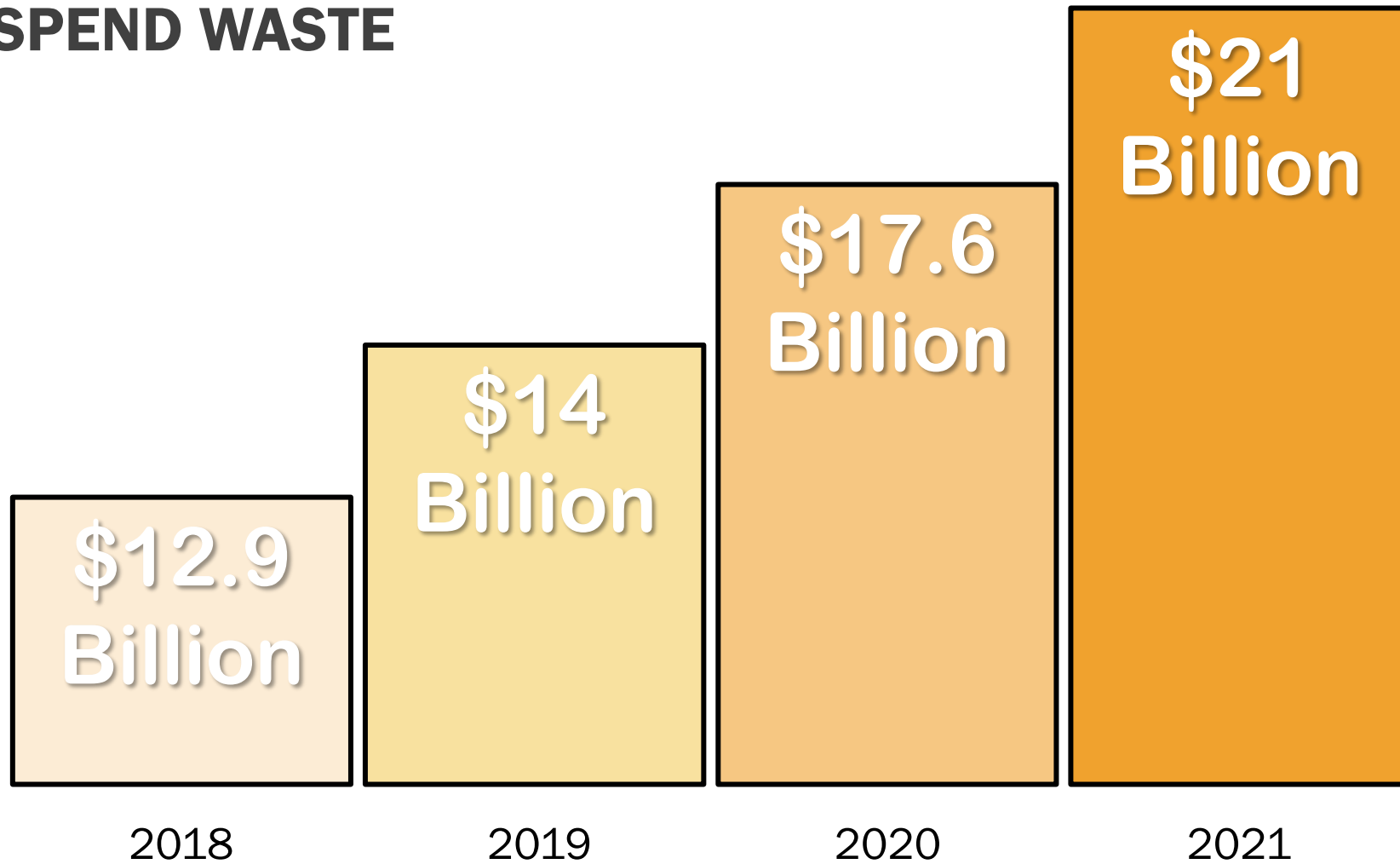
Who is Responsible?



MINIMIZING CLOUD SPEND WASTE



CLOUD SPEND WASTE



UNDERSTAND COST FACTORS

Type: Compute, Memory, General

Size: CPU/GPU and memory – i.e., large, x-large

Purchasing Method : On Demand, Reserved, Spot

Region: where instance will be launched

Capacity: Provisioned read/write

Storage: Including indices

Services: Such as Data transfer or streams

Throughput: Reserved provisioned throughput

Type of Storage: Amount of redundancy and accessibility speed

Data Transfer: In/out Frequency and number of requests

Quantity: Number of files storage units requested

Region: Where data storage is requests

Compute // Serverless Compute

Database // Serveless DB

File Storage

Requests: Number of executions your function will perform

Memory: The amount of allocated memory per function

Time: Average execution time

Region: Where function will be launched

Type: Based on Database Transaction Units

Size: Based on the number of virtual cores

License: Open Source or Commercial

Purchase Method: (On Demand, Reserved, Spot)

Hidden Costs

Strategies for Cost Savings

RIGHT SIZE

Right Size the machine for the job



SHUTDOWN SCHEDULE

Control running hours for resources



SPRAWL CONTROL

Control sprawl of virtual machines



DISCOUNTS

If discount available, use it!



EXPIRATION DATE

Monitor & delete expired instances



TAGS

Keep track of resources with logical tags



Strategies for Cost Savings

ORPHAN CHECK

Check for orphaned storage and lingering snapshots



LOGGING

Log user activities for audit and cross reference

ALERTS

Alerts and alarms notify you of reaching budget constraints



BUDGETS

Utilize budgets that will ensure you won't overspend

LIFECYCLE MGMT

Automatically move data to a less expensive storage or purge data



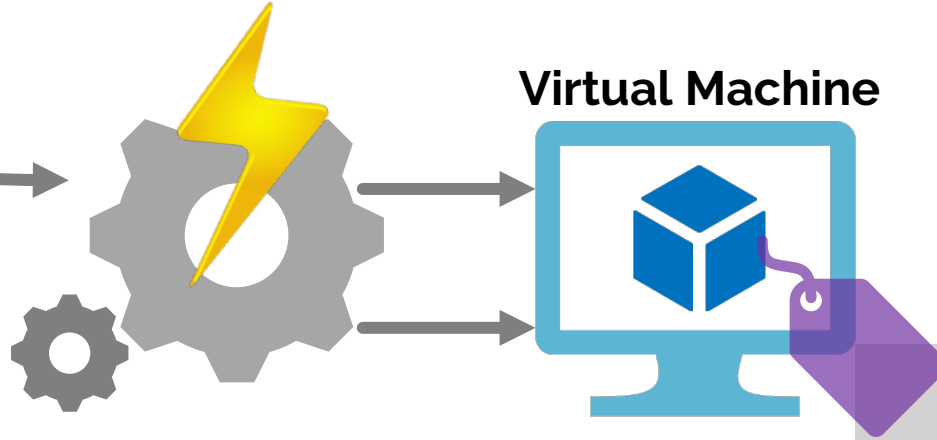
AUTOMATE

Use Templates to stand-up/bring down stacks

Automation Example



Start VM



Shutdown VM



```
{  
  "Monday-Thursday": {  
    "Start": "9",  
    "Shutdown": "17"  
  },  
  "Friday": {  
    "Start": "9",  
    "Shutdown": "16"  
  },  
}
```

Resources



<https://calculator.aws/#/>

<https://azure.microsoft.com/en-us/pricing/calculator/>

<https://cloud.google.com/products/calculator/>

[ec2instances.info](https://calculator.aws/#/ec2instances.info)

<https://azure.microsoft.com/en-us/pricing/tco/>

<https://cloud.google.com/pricing/>

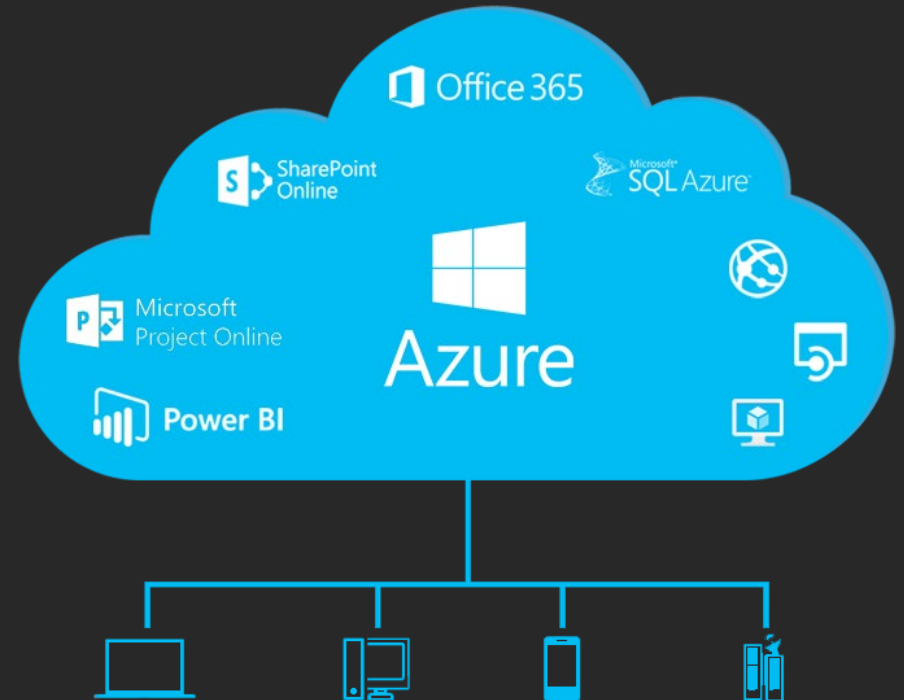
<http://www.gulamshakir.com/apps/s3calc/>

<http://v3.cloudpricingcalculator.appspot.com/>

<https://aws.amazon.com/tco-calculator/>

<https://calculator.s3.amazonaws.com/index.html>

HANDS ON AZURE





LINKS

- A free trial account can be obtained from Microsoft <https://azure.microsoft.com/en-us/free/>
- Search for “Azure” in the Service-now portal <https://Princeton.service-now.com>
- Portal Access – <https://portal.azure.com>

- 
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