

CompTIA Cloud+: Troubleshooting

Troubleshooting Cloud Deployment Issues



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Network Administrator

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Overview

Identifying Deployment Misconfigurations

Dealing with Outages

Troubleshooting Resource Limits

**Discovering Incompatible, Limited, and
Deprecated Services**

Troubleshooting Outdated Components





CompTIA Cloud+

Given a scenario, troubleshoot deployment issues.



When These Issues Manifest Themselves



During deployment



User base grows

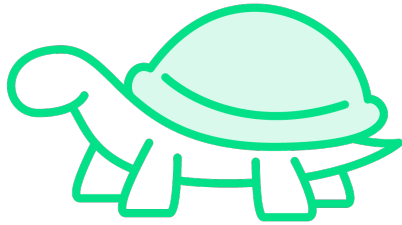


Systems scale

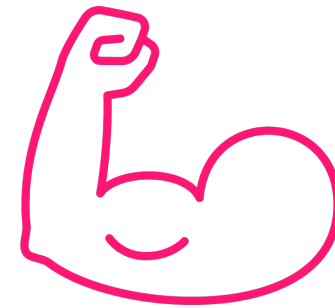


Identifying Misconfiguration Issues

Sizing Issues



Under-allocating
Less resources than needed



Over-allocating
More resources than needed



Sizing Issues



Under-allocating: slow performance



Under-allocating: unhappy users



Over-allocating: wasting money



Signs of Sizing Issues



High Utilization

This can be a sign of under-allocation

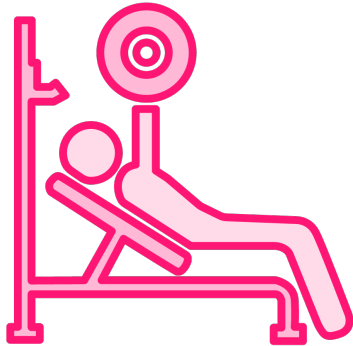


Low Utilization

This can mean over-allocation if occurring during peak traffic times



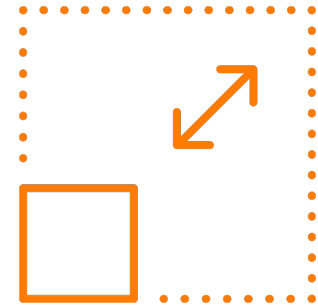
Load Testing/Performance Testing



Use load testing tools
like JMeter and
Artillery



Experiment in
test/dev environment



Size correctly in
production



Auto-scaling

Unexpected Load

Boost in users due to going viral on social media

Usual Traffic

Change in users due to the time of day



Permission Issues



If it's your first time deploying this type of resource



Check the logs and error messages

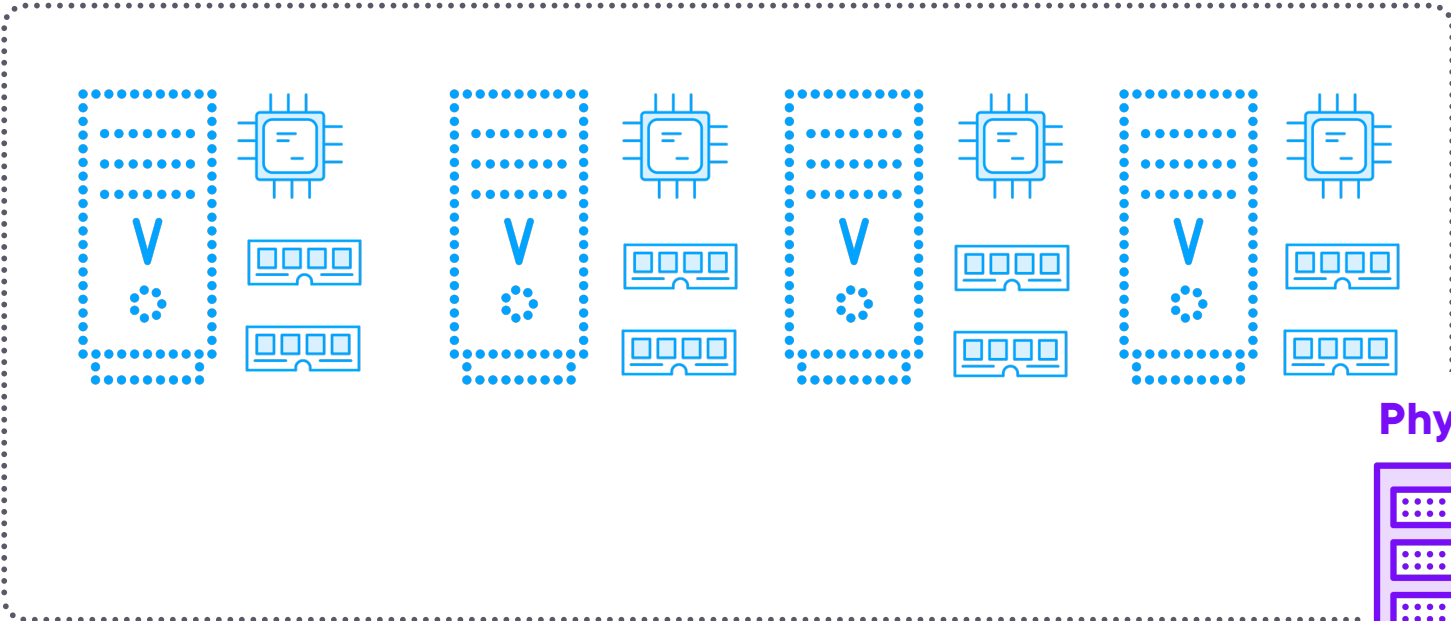


Check if you have the correct role

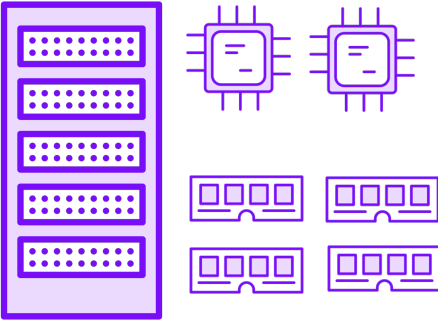


Oversubscription

Virtual

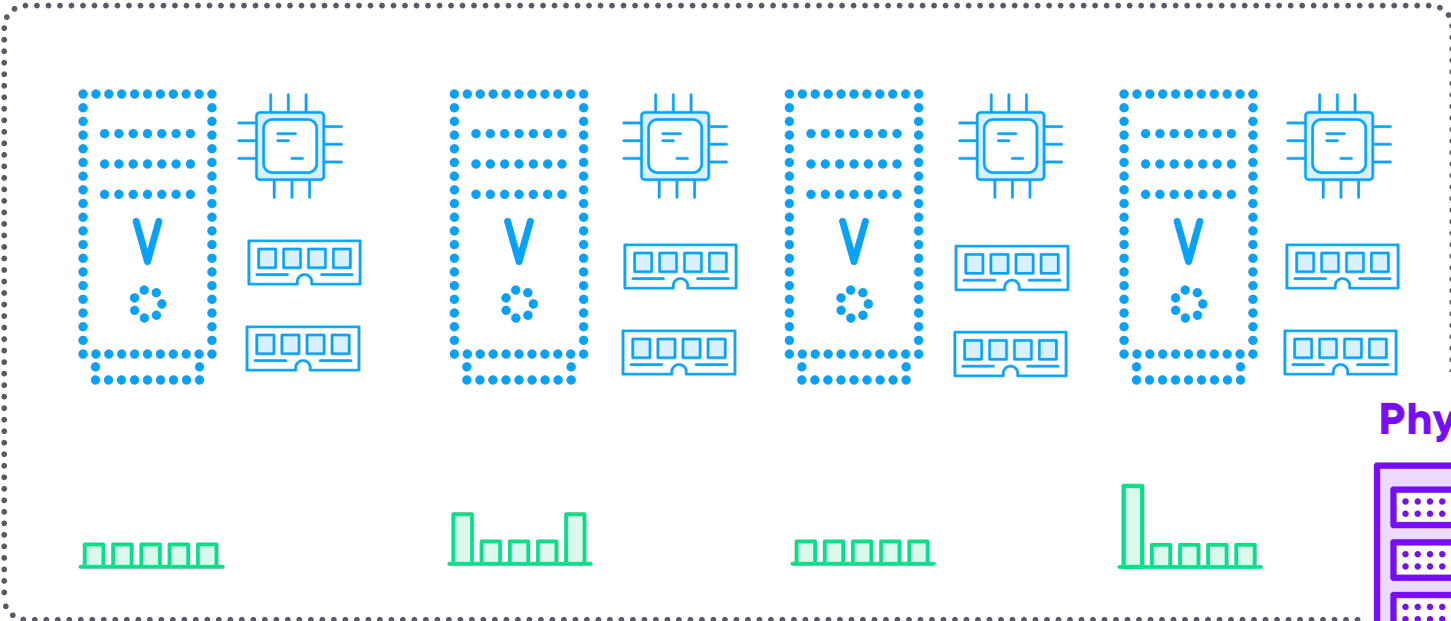


Physical

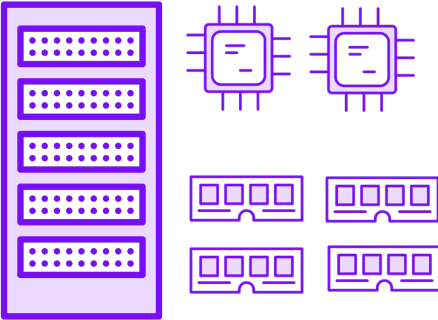


Oversubscription

Virtual

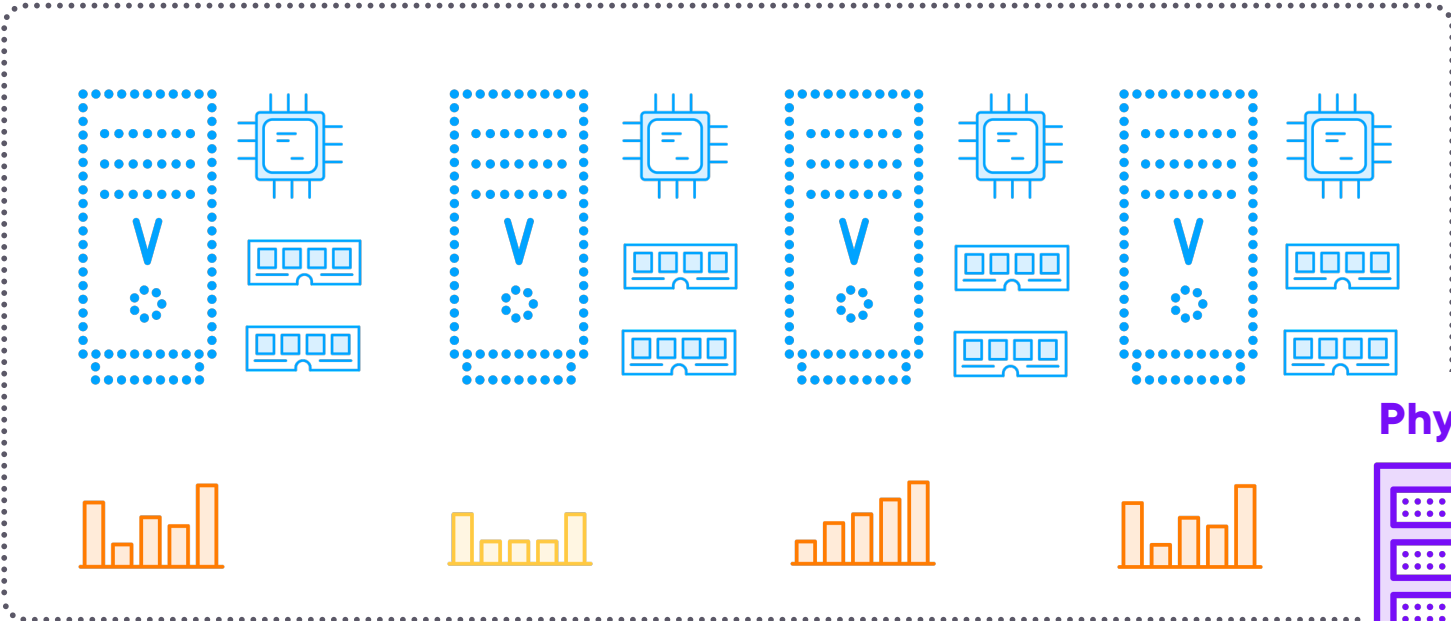


Physical

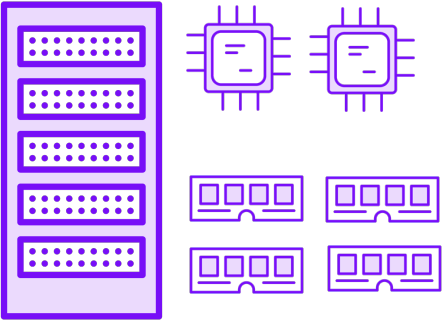


Oversubscription

Virtual



Physical



Oversubscription Solution



Dedicated Host

Only your resources are used on this host



More Expensive

Costs are greater and can have unused resources, wasting money



Oversubscription Solution (in Private Cloud)



**More aggressive load balancing
on hypervisor clusters**

Making use of

- Quotas
- Limits
- Reservations



Help for Other Deployment Misconfigurations



Documentation



Templates



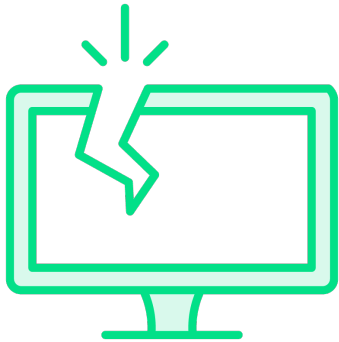
Infrastructure as Code (IaC)





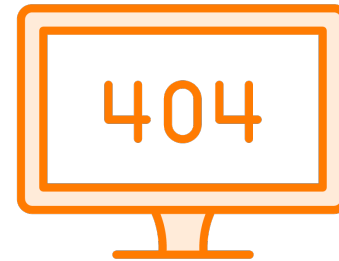
Dealing with Outages

Types of Outages



Full Outages

The whole service is down



Partial Outages

Certain features are down
or it's down in some regions



Full Outages



Easily Identifiable

A major issue that takes down a whole service is easy to spot



Devastating

Everything about the service is completely down



Status Pages

If you haven't made any changes recently, it might not be a problem with your software

It's quick, simple, and can save a lot of time during troubleshooting



Some Popular Cloud Platform Status Pages

Oracle Cloud

<https://ocistatus.oraclecloud.com/>

Amazon Web Services

<https://health.aws.amazon.com/health/status/>

Google Cloud

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

Microsoft Azure

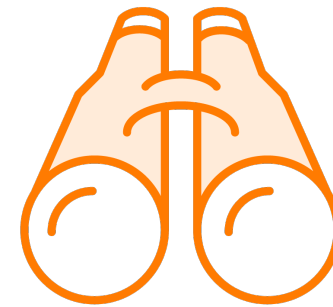
<https://azure.status.microsoft.com/>

Status Pages



Check the Status Page

Checking status pages first to see if it is an issue outside your control



Tie into Monitoring

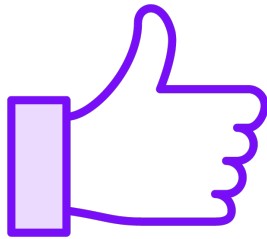
Adding to monitoring systems and dashboards so it's easy to see



Guaranteed Uptime

Uptime	Allowed downtime a year
99%	3.7 Days
99.9%	8.8 Hours
99.99%	53 Minutes
99.9999%	5 Minutes

Partial Outages



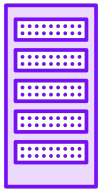
Mostly Functional
Most of the service works as expected



Partially Broken
Some services or some regions aren't working as expected



Protecting with Redundant Design



On different hosts in different racks



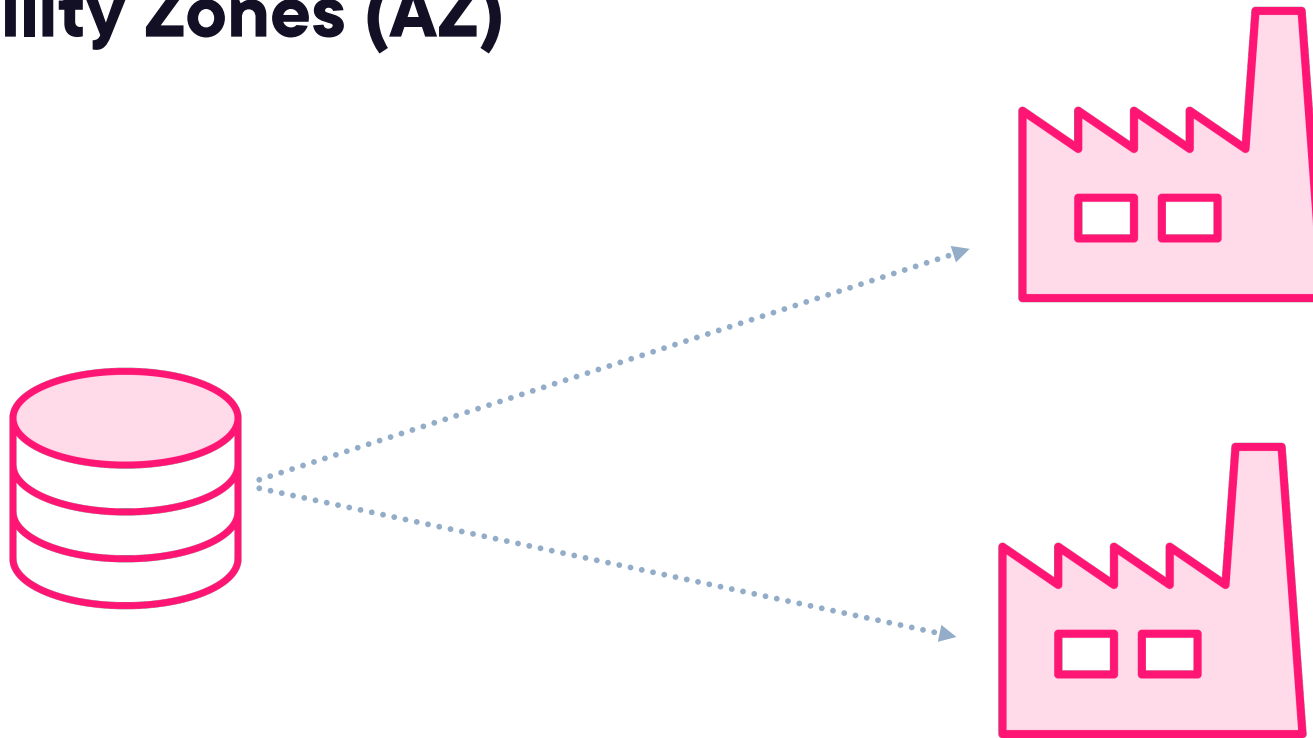
In separate datacenters within the region



In separate geographical regions



Availability Zones (AZ)



Geographically separated data centers within a cloud region

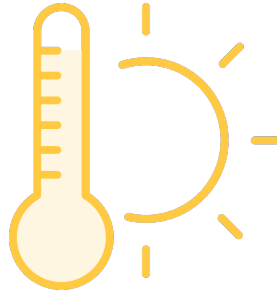


Protecting with Redundant Design



Server Rack

Switch Failures
Hardware Failures



Datacenter

Cooling Issues
Power Outages
Fires



Region

Natural Disasters
Regional Outages





Post Incident Lessons Learned Meeting

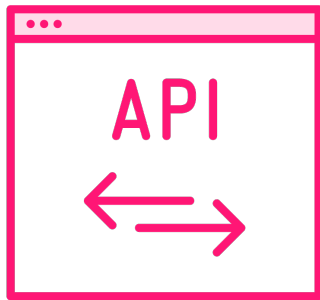
Discuss adding Availability Zones to your solution and the benefits it can provide





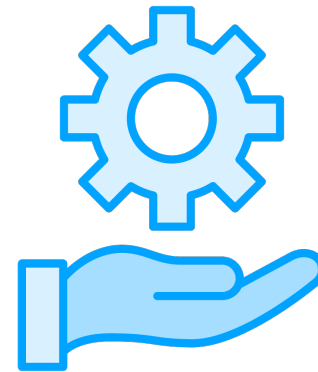
Troubleshooting Resource Limits

Resource Limits



API Throttling/Rate Limiting

The restriction of API requests once you've reached the rate limit



Service Quotas

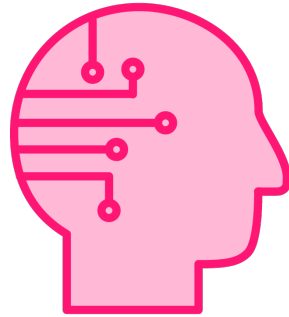
A cap that is set on the number of services you can have in a cloud environment



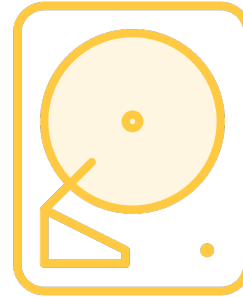
Application Programming Interface (API)



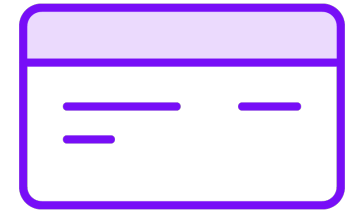
Email Gateways
Emails per
month



AI Services
Requests per
minute



Cloud Storage
Uploads per
minute



Payment
Transactions per
second



```
PowerShell x + v
-a---      8/21/2024 10:59 PM      14400 file.mp3
-a---      8/21/2024 11:00 PM      14400 file0.mp3
-a---      8/21/2024 11:00 PM      14400 file1.mp3
-a---      8/21/2024 11:00 PM      13920 file2.mp3
-a---      8/21/2024 11:00 PM         364 file3.mp3
-a---      8/21/2024 11:00 PM         364 file4.mp3

PS C:\voices> get-content .\file4.mp3
{
  "error": {
    "message": "Rate limit reached for tts-1-hd in organization org-Peq74sa
tBtWV3Gd87x4AnHBk on requests per min (RPM): Limit 3, Used 3, Requested 1. Plea
se try again in 20s. Visit https://platform.openai.com/account/rate-limits to l
earn more.",
    "type": "requests",
    "param": null,
    "code": "rate_limit_exceeded"
  }
}
PS C:\voices>
```

Status 429: Too many requests

<https://developer.mozilla.org/en-US/docs/Web/HTTP/Status/429>



API Throttling Solutions



Caching

Save the response you get back to save on requests



Batch Requests

Put multiple requests into a single batch request



Exponential Backoff

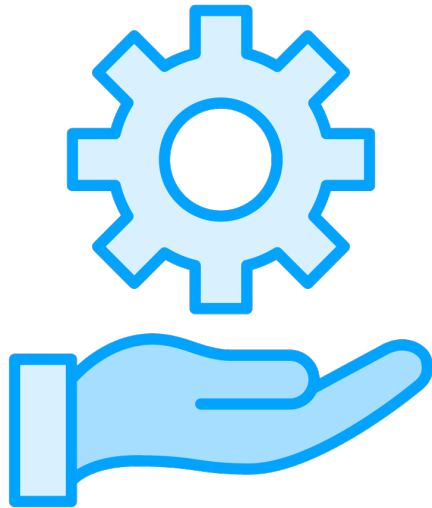
Gradually increase wait time between retry attempts



Upgrade Tier

Higher tiers usually offer higher rate limits

Service Quotas



Limitations on the quantity of a specific cloud service

Can be a problem as you scale large enough to hit the quota, causing your app to stop scaling

Find the default quota in documentation or in the admin console

Service quotas will be

- Adjustable
- Non-adjustable



Service Quotas

The screenshot shows the AWS Service Quotas console for Amazon S3. The page title is "Amazon Simple Storage Service (Amazon S3)". Below the title, there is a description: "Amazon Simple Storage Service (S3) provides easy-to-use object storage to store and retrieve any amount of data in the cloud." The main section is titled "Service quotas" and includes a "Request increase at account level" button. A search bar is present with the placeholder text "Search by quota name". Below the search bar is a table with the following columns: Quota name, Applied account-level quota value, AWS default quota value, Utilization, and Adjustability. The table lists several quotas, including Access Points, Bucket policy, Bucket tags, Directory buckets, Event notifications, General purpose buckets, Lifecycle rules, Maximum part size, and Minimum part size. The Applied account-level quota value for all listed quotas is "Not available".

Quota name	Applied account-level quota value	AWS default quota value	Utilization	Adjustability
Access Points	Not available	10,000	Not available	Account level
Bucket policy	Not available	20 kilobytes	Not available	Not adjustable
Bucket tags	Not available	50	Not available	Not adjustable
Directory buckets	Not available	10	Not available	Account level
Event notifications	Not available	100	Not available	Not adjustable
General purpose buckets	Not available	100	Not available	Account level
Lifecycle rules	Not available	1,000	Not available	Not adjustable
Maximum part size	Not available	5 gigabytes	Not available	Not adjustable
Minimum part size	Not available	5 megabytes	Not available	Not adjustable

<https://console.aws.amazon.com/servicequotas/home/services/s3/quotas>



<https://t.me/learningnets>

Service Quotas

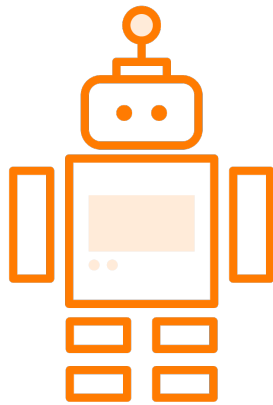
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Quota name	Applied account-level quota value	AWS default quota value	Utilization	Adjustability
<input type="radio"/> Access Points	Not available	10,000	Not available	Account level
<input checked="" type="radio"/> Bucket policy	Not available	20 kilobytes	Not available	Not adjustable
<input checked="" type="radio"/> Bucket tags	Not available	50	Not available	Not adjustable
<input type="radio"/> Directory buckets	Not available	10	Not available	Account level
<input checked="" type="radio"/> Event notifications	Not available	100	Not available	Not adjustable
<input type="radio"/> General purpose buckets	Not available	100	Not available	Account level
<input checked="" type="radio"/> Lifecycle rules	Not available	1,000	Not available	Not adjustable
<input checked="" type="radio"/> Maximum part size	Not available	5 gigabytes	Not available	Not adjustable
<input checked="" type="radio"/> Minimum part size	Not available	5 megabytes	Not available	Not adjustable

<https://console.aws.amazon.com/servicequotas/home/services/s3/quotas>

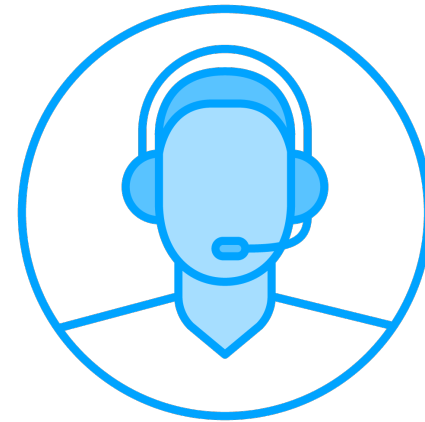
<https://t.me/learningnets>

Requesting Service Quota Increase



Automated

The system will automatically grant your request given certain conditions are met



Manual

A human must verify that the quota can be raised to the requested limit via service ticket



Cloud Service Issues

**Incompatibility when
deploying resources**

**Limited cloud
region availability**

**Deprecation of
services in the cloud**





Incompatibility When Deploying Resources

Areas of Incompatibility

Hybrid Cloud

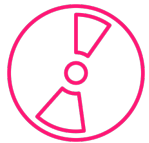
Software that you use on-prem being incompatible with the cloud

Multi Cloud

One cloud not offering the same solutions as another



Areas of Incompatibility



Incompatible software versions



Inability to send SMTP emails



Unavailable database



Incompatibility Solutions



Read Documentation

See if there is a documented solution for the incompatibility



Infrastructure as a Service

Using a “lift and shift” model when deploying to the cloud



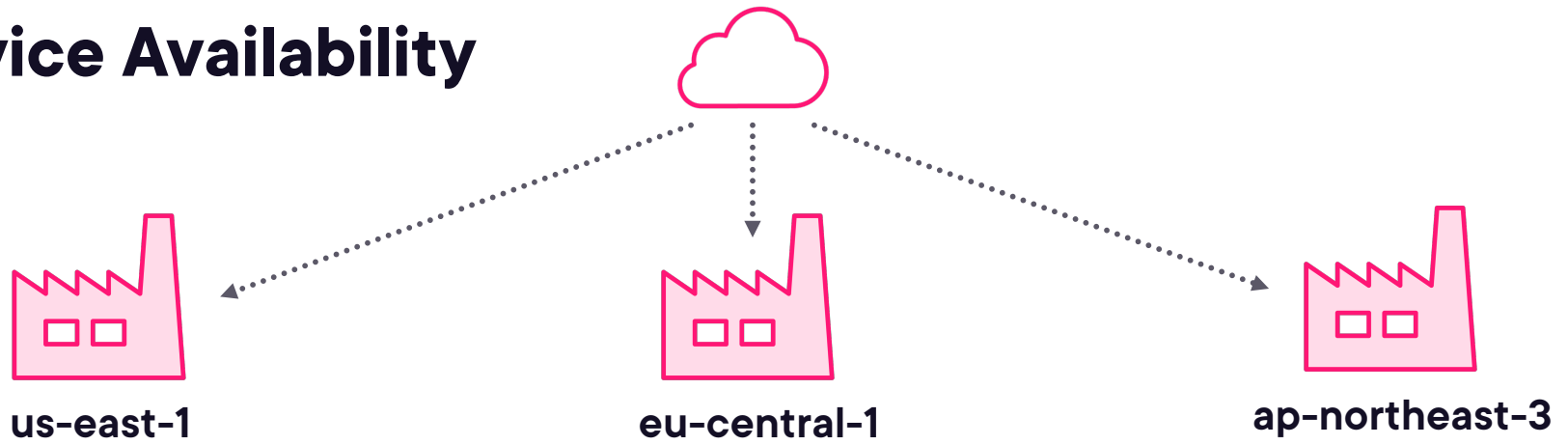


Limited Cloud Region Availability

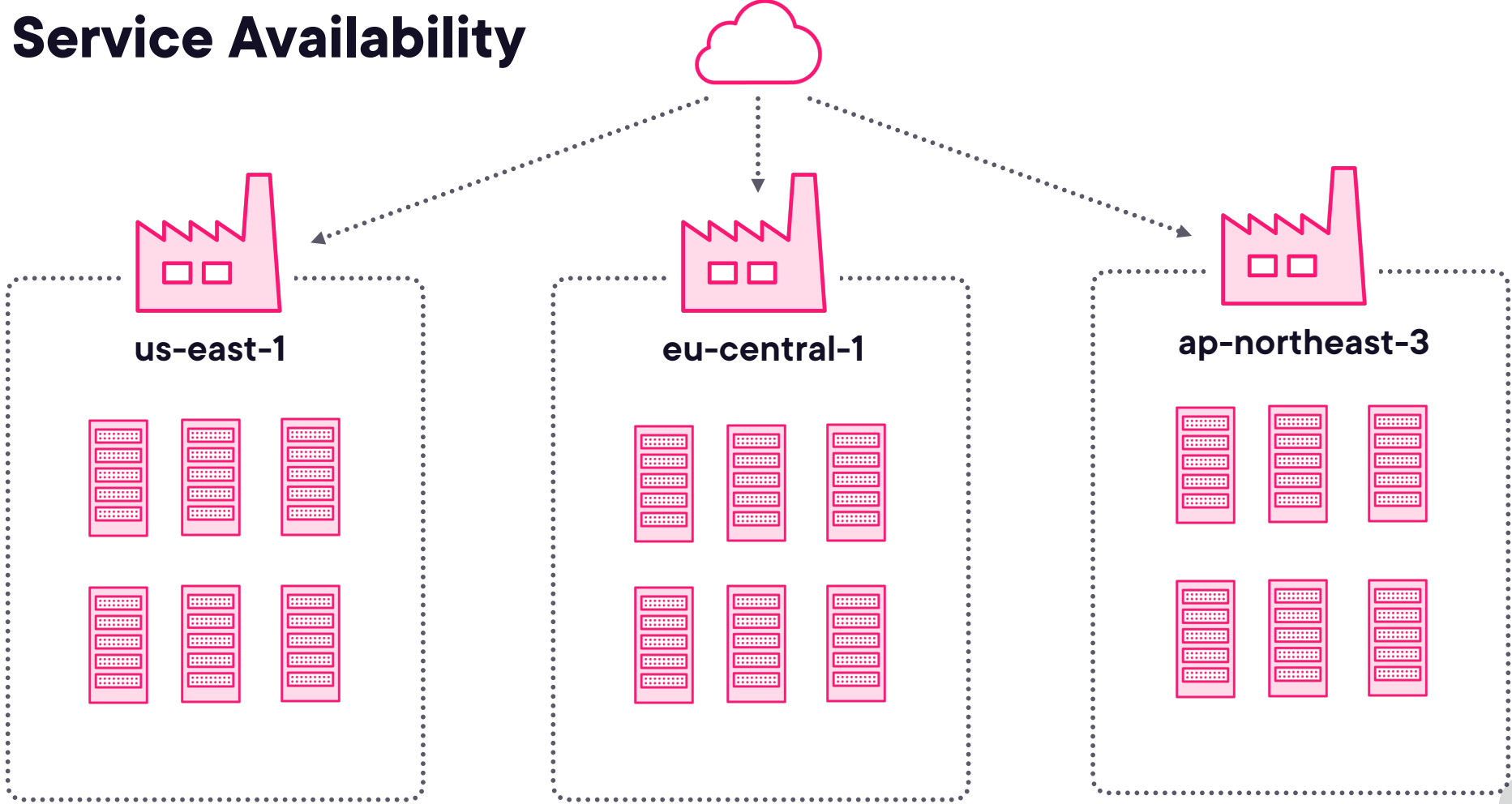
“The Cloud is just someone else’s computer.”



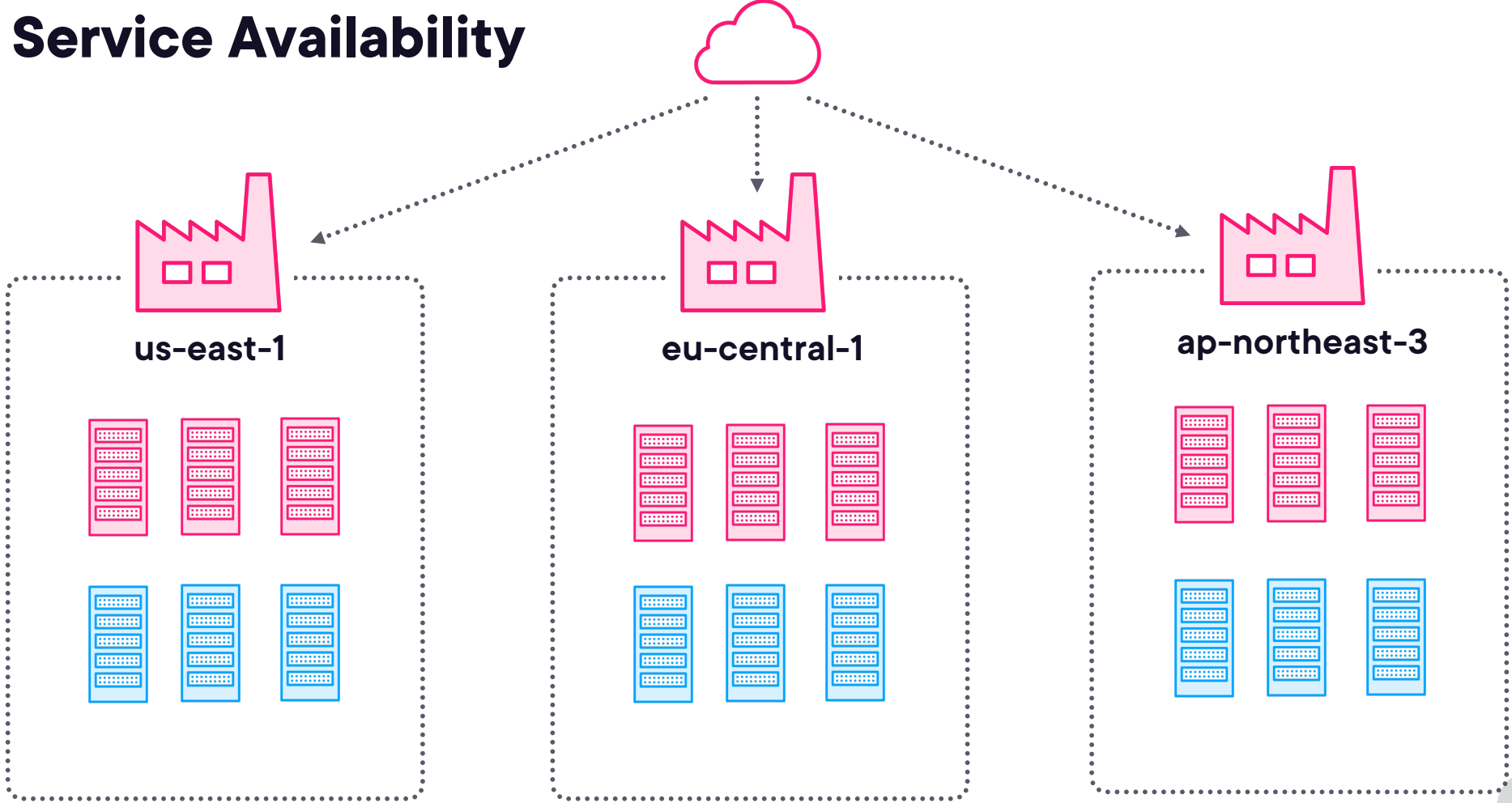
Service Availability



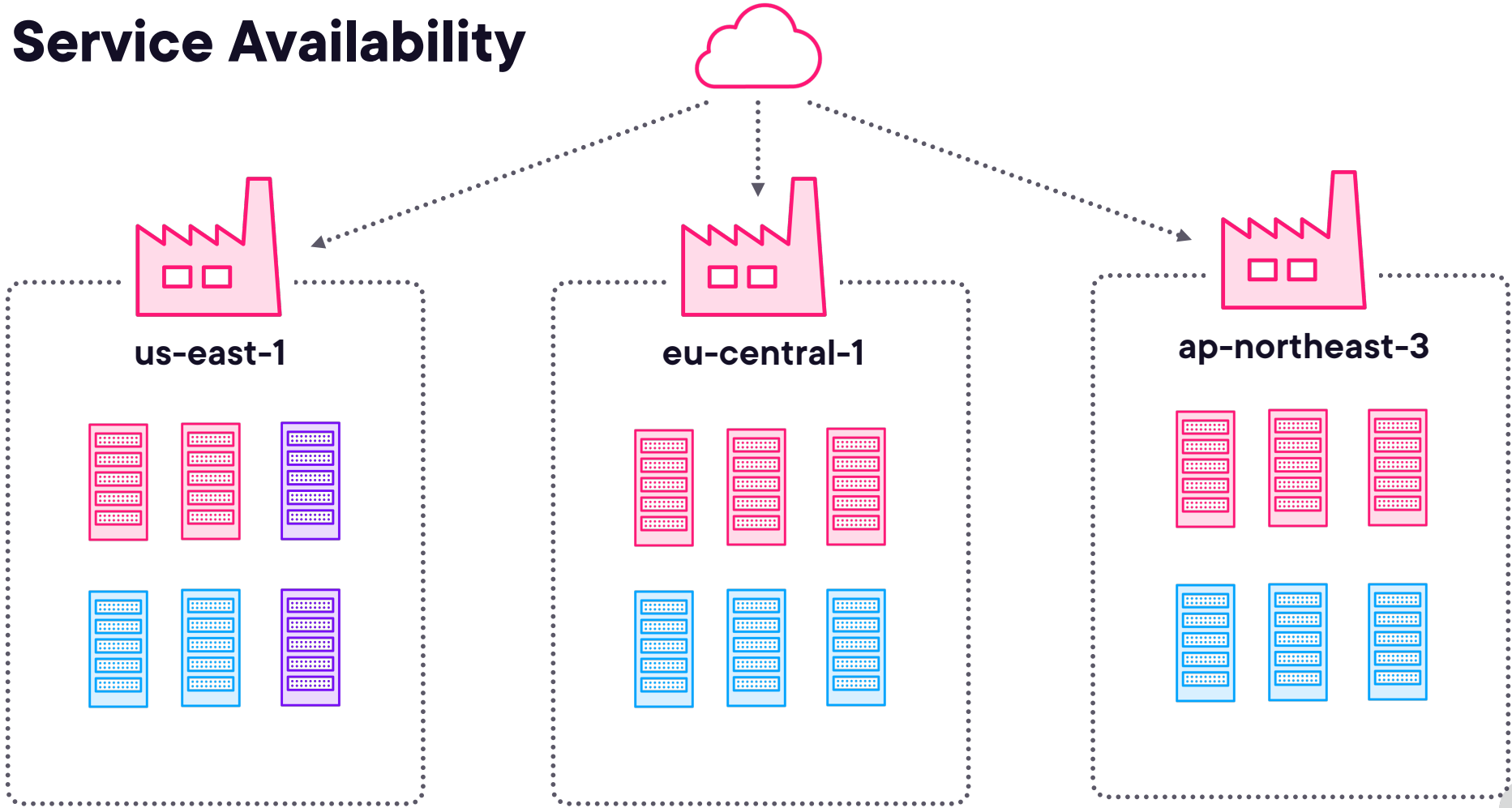
Service Availability



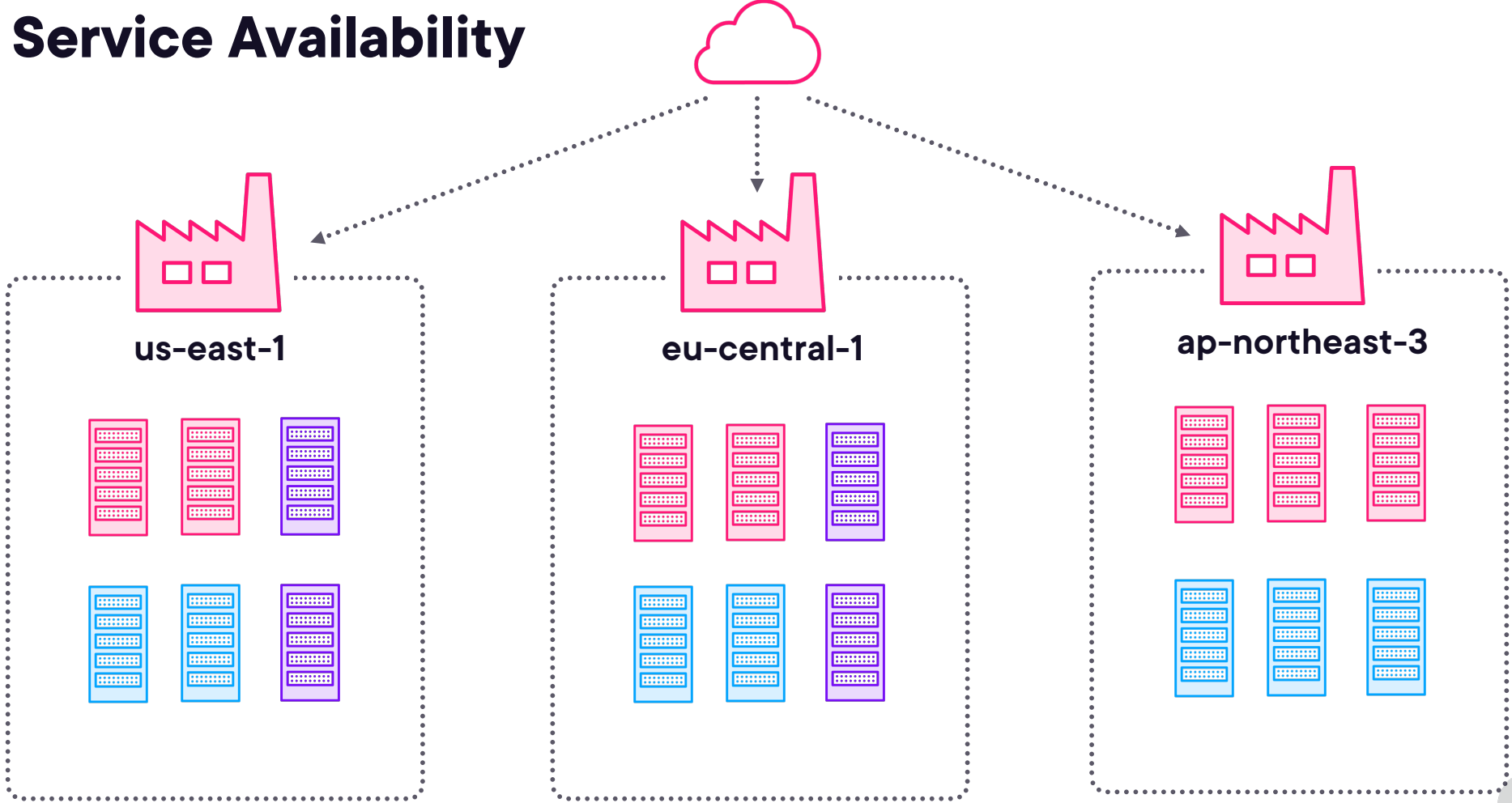
Service Availability



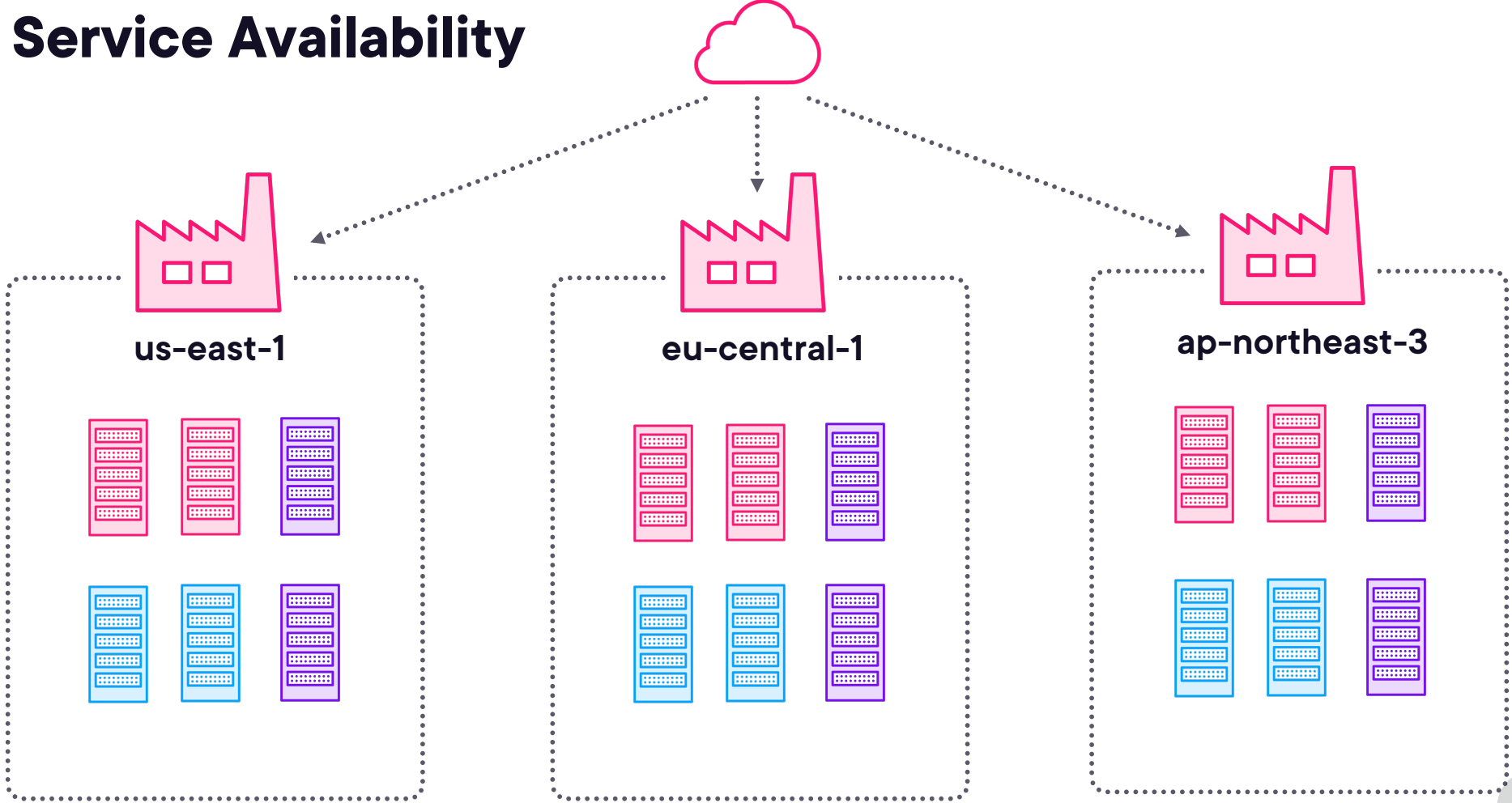
Service Availability



Service Availability



Service Availability

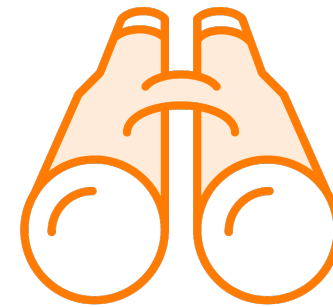


Service Unavailability Solutions



Find Another Region

There may be another region close by that has the service you need



Find a Similar Solution

Look for a similar feature that can do what you need it too





Deprecation of Services in the Cloud

Legacy vs. Cloud Software

Legacy Software

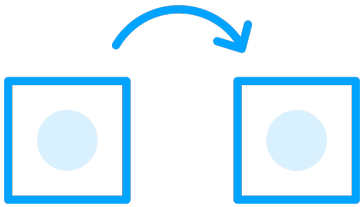
- Distributed by CD or slow network
- Usually locally deployed
- Less security concerns
- Slow releases

VS.

Cloud Software

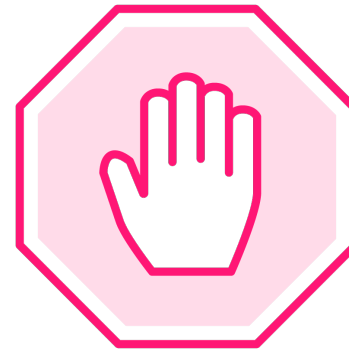
- Distributed in the cloud
- In the cloud, publicly accessible
- Security is highly important
- Fast releases with CI/CD

Problems with Deprecated Services



Migrated

To some current solution that you didn't get to choose



Stop Working

Cause the service to completely stop working



Azure Service Retirement Workbook

Microsoft Azure

Search resources, services, and docs (G+)

Home >

Service Retirement (Preview)

Azure Advisor

Workbooks Edit Refresh Refresh Help ? Help Auto refresh: Off

Choose view **Impacted Services** All Services Retired Services

Subscription: All Resource group: All Location: All

Retiring Azure services (Please note: This view only provides impact analysis for a subset of services at the moment)

Search

<input type="checkbox"/>	Service Name	Retiring Feature	Retirement Date	# Resources	Actions
<input type="checkbox"/>	Application Insights	Classic	2024-02-29	None	Learn more
<input type="checkbox"/>	Azure Time Series Insights	Entire service	2024-07-07	None	Learn more
<input type="checkbox"/>	Azure Synapse	Runtime for Apache Spark 3.2	2024-07-08	None	Learn more
<input type="checkbox"/>	Storage Account	Classic	2024-08-31	None	Learn more
<input type="checkbox"/>	App Service	App Service Environment v1/v2	2024-08-31	None	Learn more
<input type="checkbox"/>	Cloud service (classic)	Classic	2024-08-31	None	Learn more
<input type="checkbox"/>	Machine Learning Studio (classic)	Entire service	2024-08-31	None	Learn more
<input type="checkbox"/>	Virtual Machines	Av1-series	2024-08-31	None	Learn more
<input type="checkbox"/>	Virtual Machines	HB-series	2024-08-31	None	Learn more
<input type="checkbox"/>	Virtual Network	Classic	2024-08-31	None	Learn more
<input type="checkbox"/>	Azure Cache for Redis	Classic	2024-08-31	None	Learn more

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<input type="checkbox"/>	Virtual Network	Classic	2024-08-31	None	Learn more
<input type="checkbox"/>	Azure Cache for Redis	Classic	2024-08-31	None	Learn more

Service Deprecation Solutions



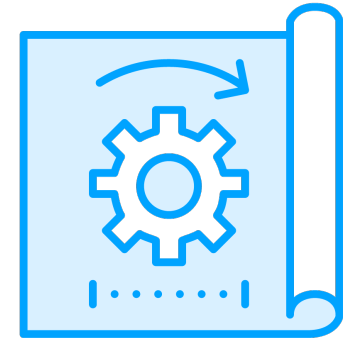
Read Documentation

Find lifecycle of the services



Set Alerts

In time to work on a migration



Plan Migration

Figure out what to use as a replacement



Troubleshooting Outdated Components

What Is a Component?



Software



Operating Systems



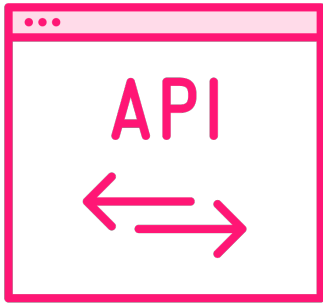
Infrastructure as Code (IaC) Templates



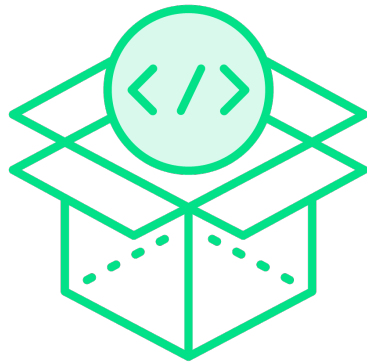
Containers



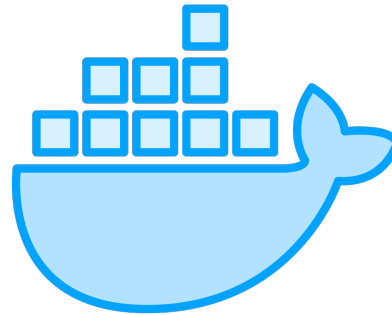
Examples of Outdated Components



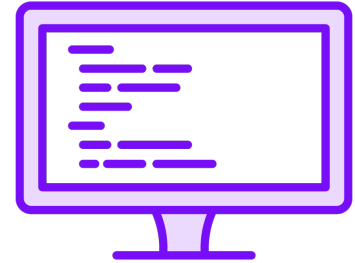
Old API Version



Old IaC
Template
Version



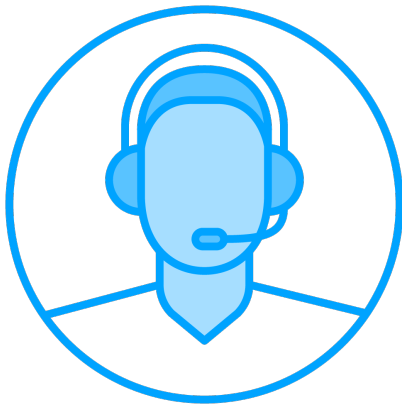
Old Container
Version



Old Software
Library



Problems with Outdated Components



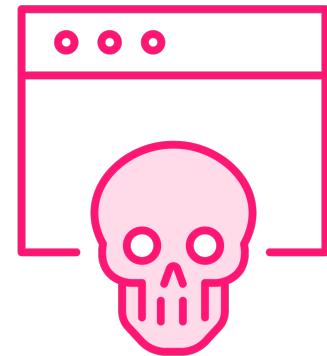
Supportability

Reaching end of life means there is little support



Broken Functionality

Components aren't guaranteed to continue working



Vulnerable

They get less security updates



Outdated Component Solutions



Use automated patching



Schedule a task to check the component versions



Vulnerability scans can help find outdated components



Read specifications for what you deploy





Summary

Solving misconfiguration issues

How to minimize the effect of outages

Finding the limits of our resources

Dealing with incompatible services

Troubleshooting outdated components





More Information

CompTIA Cloud+ (CVO-004): Deployment
Michael Brown



Up Next:

Troubleshooting Network Issues

