



2018 AWS re:Invent Releases and Recent announcements

A sampling of a few of interest

CIT Cloudification Services : Ned La Celle



AWS DataSync

- Online transfer service that simplifies, automates, and accelerates moving data between on-premises storage and AWS storage: S3 or EFS



AWS DataSync

CloudTeam comments and testing results :

- Fast, Fully managed (no extra scripts required) data xfer for on-premises large file systems to from NFS to S3 or EFS
- Not a real-time, constantly, syncing tool. **Manually initiated syncing**
- Only **one task** can be running at any given time
- **On-premises VM Appliance that is "hefty"**
 - 4 virtual processors
 - 80 GB of disk space for VM images installation and system.
 - RAM 32 GB – 64GB
 - VMware ESXi Hypervisor (version 6.0 or 6.5 or 6.7)
- **It's fast**



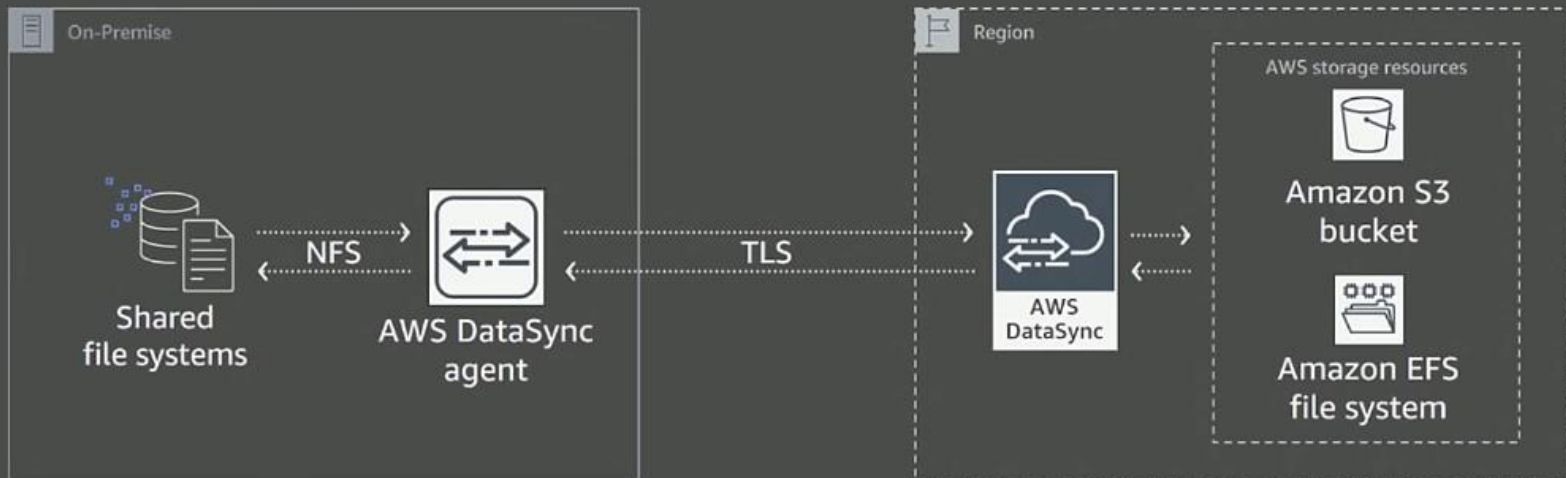
AWS DataSync

- Deploy **DataSync agent** and associate to account.
- Source/Destination – transfer from on-premises servers to AWS and vice versa.
- Data is encrypted in transit
- Writes data to AWS S3 or EFS preserving metadata
- Performance – The overall data transfer speed is a function of overall network conditions; a single agent can saturate a **10 Gbps network link**.
- Pricing – **4cents/GB** charge for data transfer; there is no charge for the service itself
- Caveat : (**NFS connection only at this point**)



AWS DataSync – How it works

How AWS DataSync works



Deploy on-premises agent for fast access to local storage



Data transfer over the WAN using purpose-built protocol



Service in AWS writes or reads data from AWS storage services



Managed from AWS Console or Command Line Interface (CLI)

AWS DATA SYNC

12/1/18 @awsgeek

IN THE CLOUD

ELASTIC FILE SYSTEM

S3 BUCKET

Management

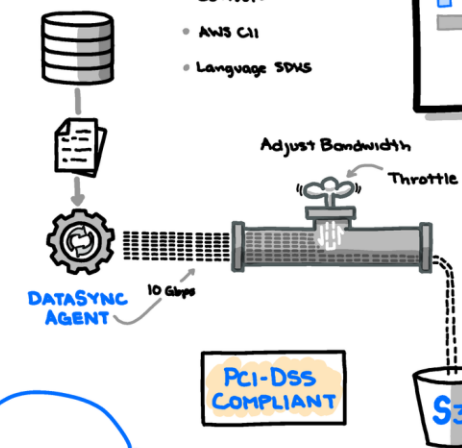
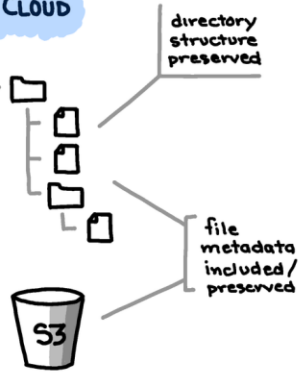
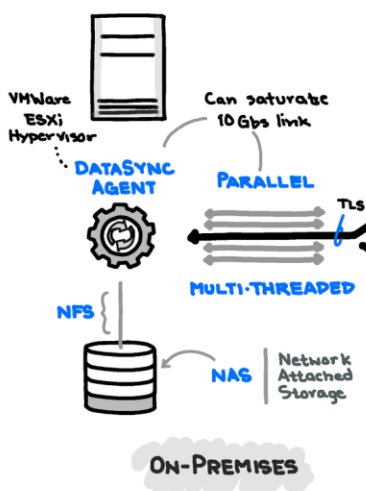
- Console
- AWS CLI
- Language SDKs

Pricing

4¢/GB

Performance

- Incremental xfer
- Sparse file detection
- Inline compression



TRANSFERRING DATA TO S3? WHICH SERVICE TO USE?

AWS DATASYNC



migrate active datasets

timely, accelerated transfer

backup and disaster recovery

AWS SNOWBALL



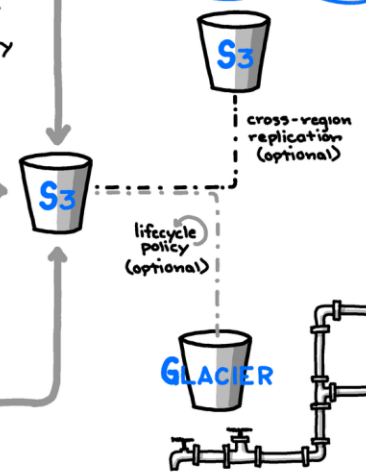
bandwidth constrained or disconnected environments

AWS STORAGE GATEWAY



low latency access to transferred files

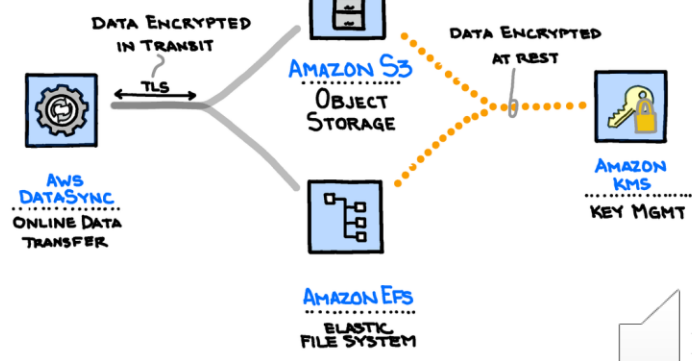
file gateway



AMAZON VPC ISOLATED RESOURCES

SYNC OPTIONS

- Post-copy file validation?
- File metadata choices
- Remove deleted files?
- Set bandwidth limit





AWS DataSync – Test Results

Initial test runs to empty buckets:

Daily calculations are based on a 4 hour sync schedule (6 total syncs / day)

Share	Data Transferred (MB) Initial / daily	Files Transferred (MB) Initial / daily	Duration initial/daily	MiB/s initial/daily	Files/s Initial / daily	Est. Cost \$0.04 per GB Initial / daily	Actual Cost \$0.04 per GB - Daily (every 4 hours)	Est. Cost API calls initial/daily	Actual API calls Initial / daily (every 4 hours - 6 syncs)	Copy Permissions / Ownership (more API calls?)
ftp_data	1004058.77 / 1361.82	2966010 / 2282	57 min, 32 sec / < 10 min	290.89 / 2.14	859.3 / 3.59	\$40.16 / \$0.33	\$0.05	~\$35	\$14.86 / ~\$6	N
lucene	8309 / 12302.09	6892 / 20068	2 min / < 30 seconds	67.21	55.79	\$0.33	\$0.48	~\$0.10	~\$0.10 / ~\$0.17	Y
orig_data	472463.08 / 401.54	1603710 / 712	29 min, 42 sec / 6 min, 27 sec	265.06 / 1.04	899.72 / 1.84	\$18.90 / \$0.10		~\$25	\$10.38/~\$0.10	N

Significantly slower speeds when retaining file permission and ownership

1 simultaneous task (sync) per agent (cloudsvcs-choo4) - No concurrent tasks (AWS suggests concurrent tasks are on the road map)

1 TB of 3 million files = \$40 to sync + \$14 in API calls (also not including S3 storage cost), took 57 min, 290 MiB/s transfer rate⁷



Lambda Layers

- Lambda Layers are a new type of artifact that can contain arbitrary code and data, and may be referenced by zero, one, or more functions at the same time
 - package up a set of files and include them
 - similar to a shared library in code
- attached to the lambda runtime in the /opt directory
- can use layers published by others
- layers can be used to implement custom runtimes
- layers need to be tested separately
 - Serverless Application Model (SAM) can be used to download and cache the layer for local testing

RUNTIMES



NODE.JS



PYTHON



RUBY



CORE

POWERSHELL



JAVA



C#



GO

... and more

OR PROVIDE YOUR OWN

BYOR RUNTIME



LAMBDA
RUNTIME



YOUR
RUNTIME
CODE



php

RUST
HASKELL
ERLANG

COBOL

C++

TRIGGERS

AMAZON
S3



AMAZON
DYNAMODB



AMAZON
KINESIS



CLOUDWATCH
EVENTS



AMAZON
SNS



AMAZON
SQS



AMAZON
API GATEWAY

... AND
MANY
MORE

FUNCTIONS



EXECUTION TIME



MEMORY



PERMISSIONS



CODE



SECURITY



/tmp

aws LAMBDA

RUN CODE WITHOUT THINKING ABOUT SERVERS

• a visual primer •

@awsgeek 12/22/18



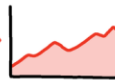
cc by-nc 2.0

[really, just
my notes]

MONITORS



CLOUDWATCH
EVENTS, LOGS



METRICS
& ALARMS



LOGS



CLOUDTRAIL

LAYERS



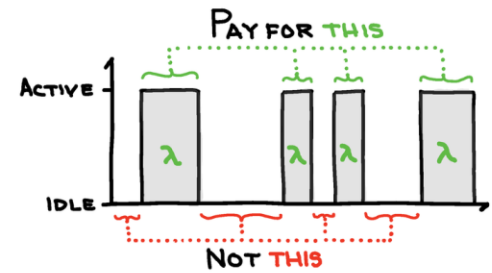
YOUR APPS,
LIBS, CODE

PACKAGED
TOGETHER



SHARED
W/ MANY
FUNCTIONS

COSTS



DURATION :: 0.001667¢/GB/s
REQUESTS :: 20¢/MM

+ DATA TRANSFER, ETC

@EDGE



YOUR CODE



AMAZON
CLOUDFRONT



YOUR USERS



Lambda Layers

- Best practices
 - layers should only be used for code or resources shared across multiple functions
 - should be small
 - should do one thing, have one focus
 - thing is relative in this context, think collection of functionality



Lambda Layers

- Custom Runtimes

- Allow the installation and use of a language or version of a language not supported natively
- a downside to this is a layer of abstraction is removed, the **runtime now has to be managed manually** going forward
- best practice is to only use Custom Runtimes if needed due to the added maintenance/management




Lambda Layers : Examples

- Bash
 - [GitHub - gkrizek/bash-lambda-layer: Run Bash scripts in AWS Lambda via Layers](#)
 - Tutorial from AWS docs in Useful References is also focused on a bash runtime
- Node.js
 - [A custom runtime for AWS Lambda to exec functions in Node.js v10.x or v11.x](#)
- php 7.x
 - [PHP on Lambda? Layers Makes it Possible!](#)
- cfml (coldfusion/lucee)
 - [GitHub - foundeo/fuseless: Toolkit for running Serverless CFML on AWS Lambda](#)
 - [GitHub - foundeo/fuseless-template](#)
 - [FuseLess - Serverless CFML for AWS Lambda](#)
- λ **AWSome Lambda Layers. (GIT repo of cool code for use cases of layers)**
 - [A curated list of awesome AWS Lambda Layers](#)



Lambda Layers : References

- [AWS Lambda Now Supports Custom Runtimes, and Enables Sharing Common Code Between Functions](#)
- [AWS Lambda Layers - AWS Lambda](#)
- [Custom AWS Lambda Runtimes - AWS Lambda](#)
- [Tutorial – Publishing a Custom Runtime - AWS Lambda](#)
- [GitHub - nsriram/aws-lambda-layer-example: aws lambda layer example](#)
- [Getting started with AWS Lambda Layers for Python \(1/2\)](#)
- [Injecting Chaos to AWS Lambda functions using Lambda Layers \(2/2\)](#)
- [λ AWSome Lambda Layers \(curated list of Lambda Layers\)](#)
- [Deep Dive Into Lambda Layers and the Lambda Runtime API](#) 



AWS Marketplace for Containers

- Find container products in AWS Marketplace and the Amazon Elastic Container Service (Amazon ECS) console.
- Deploy container products from AWS Marketplace on Amazon Container Services such as Amazon ECS, Amazon Elastic Container Service for Kubernetes (Amazon EKS), and AWS Fargate.
- Find software-as-a-service (SaaS) products that help manage, monitor and protect container applications.
- Free, bring-your-own-license (BYOL), & Paid container products with both fixed monthly and usage-based pricing, making it easier to pay only for what is used.



AWS Marketplace for Containers

Participating Sellers





Transit Gateway

- AWS Transit Gateway is a service that enables customers to connect their Amazon Virtual Private Clouds (VPCs) and their on-premises networks to a single gateway.
- Makes use of the new AWS Resource Manager, that allows for sharing of AWS resources across accounts.
- Simplify network workloads with a hub and spoke design
- Can use one **Default** route-table for the connections or use **Custom** route-tables for different pathways as needed



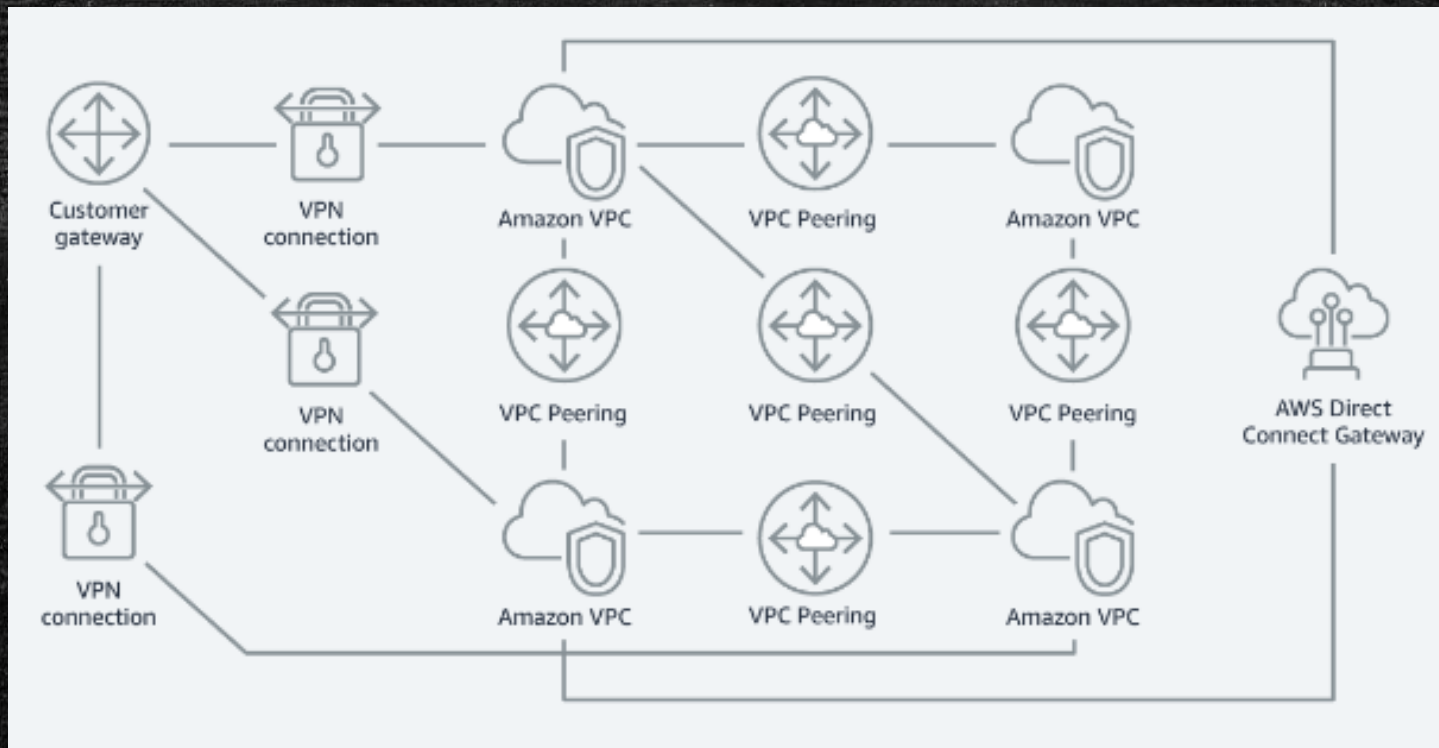
Transit Gateway

- Intended to interconnect on-prem networks and VPCs. OSI layer 3 (network).
- VPCs, VPNs and TGW must all be in the same Region (for now).
- will route traffic cross-AZ in the event of a failure, assuming it is enabled access in a healthy AZ
- Each attachment handles up to 50 Gbps of "burst" traffic
- Use cases:
 - Centralized router linking all VPCs and VPNs
 - Isolated router, using multiple route tables
 - Edge consolidator, allowing VPN-to-VPC traffic to pass but not VPC-to-VPC



Transit Gateway

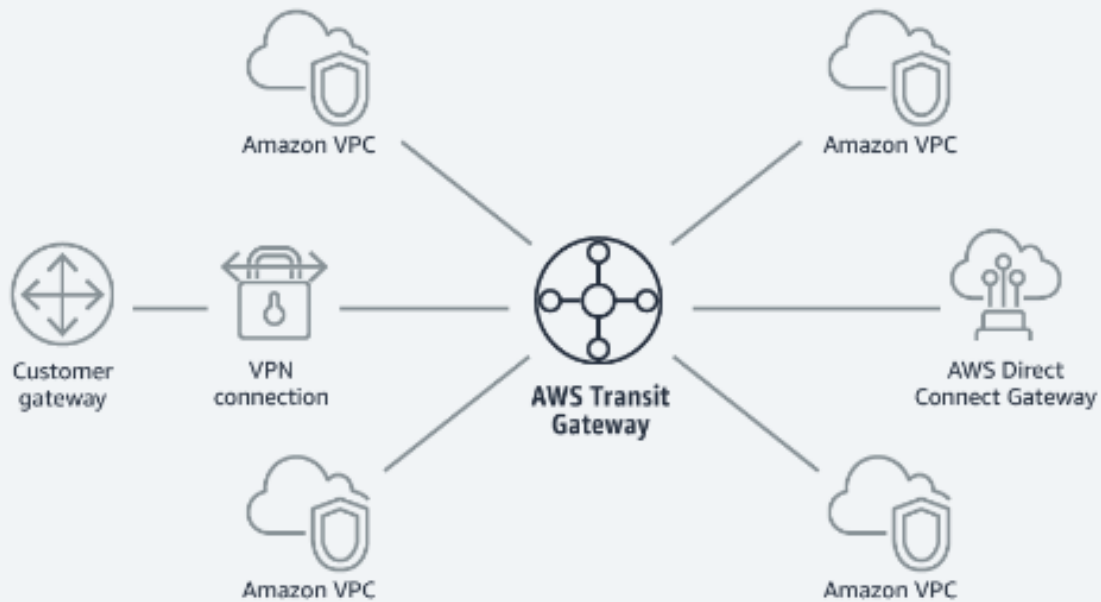
Without AWS Transit Gateway





Transit Gateway

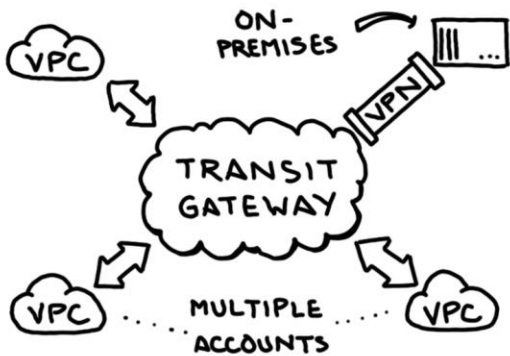
With AWS Transit Gateway





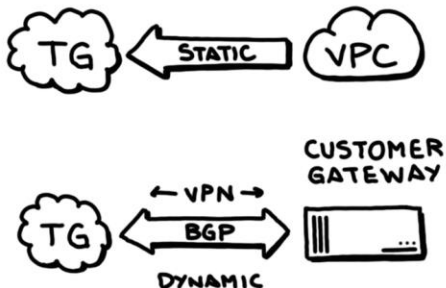
Transit Gateway

- Direct Connect not yet supported
- Other Limits:
 - 5 TGWs per account
 - 5 TGW attachments per VPC
 - 20 Route Tables per TGW
 - 10,000 routes
 - Can not reference Security Groups between spoke accounts (yet)
- Pricing (US-East1/2, Oregon)
 - Hourly fee for TGW attachment: \$0.05 per attachment
 - Per-GB data processing: \$0.02
- Use cases:
 -



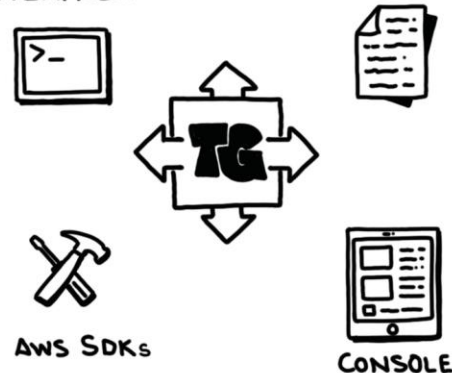
HUB *and* SPOKE

ROUTE PROPAGATION

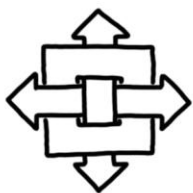
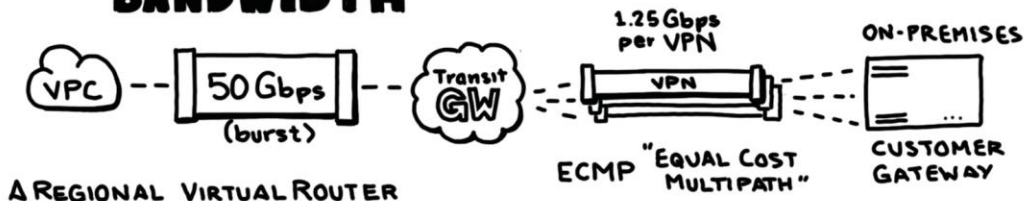


COMMAND LINE INTERFACE

CLOUDFORMATION



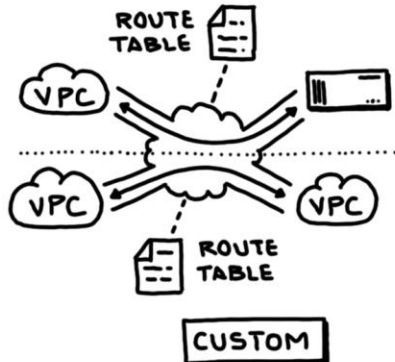
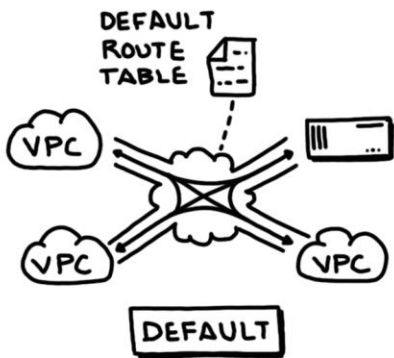
BANDWIDTH



AWS

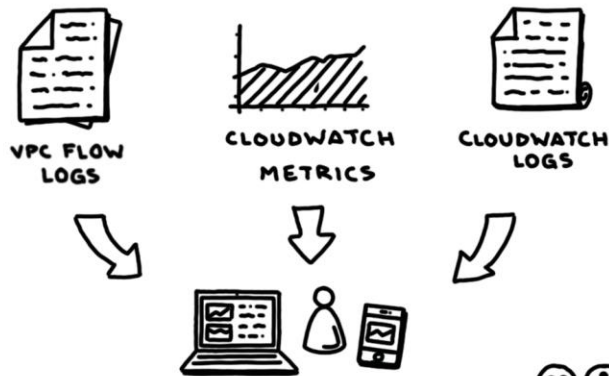
TRANSIT GATEWAY

@awsgeek



== CUSTOM ROUTING ==

••• MONITORING •••





CloudWatch Logs Insights

- Fully managed, highly scalable, log analytics capabilities.
- CloudWatch Logs Insights **automatically discovers** fields in logs from AWS services such as VPC Flowlogs, Route 53, Lambda, CloudTrail, **and any application or custom log that emits log events as JSON.**



CloudWatch Logs Insights

- CloudWatch Logs Insights supports all types of logs. For every log sent to CloudWatch Logs, three system fields are automatically generated:
- **@message** contains the raw unparsed log event.
- **@timestamp** contains the time at which the log event was added to the CloudWatch Logs.
- **@logStream** contains the name of the log stream to which the log event was added.
- Queries, aggregations, filters and regex and Visualization tools are all built in.



CloudWatch Logs Insights

Cloud Confluence page:

[CloudWatch Logs Insights - features / review](#)

Demo:

cu-cs-sandbox | CloudWatch | Insights

cu-cs-sanbox-flowlogs

"sample queries" VPC Flowlogs

stats avg(bytes), min(bytes), max(bytes) by bin(5m)

Visualization

Cornell AWS Enterprise Agreement

Enterprise Support

- Cornell has AWS Enterprise Support available for everyone that has an account under the master agreement.
- Allows creation and management of support cases while logged into the AWS console, using the support center.
<https://console.aws.amazon.com/support/home?#/>
- The AWS Support Console is the main conduit for direct communication to Amazon's support staff. It also has many Knowledge Center Videos and links to docs.
- The CIT Cloud Team is not involved in cases that are opened via this console, though we remain available for consultation.

Cornell AWS Enterprise Agreement Enterprise Support

https://console.aws.amazon.com/support/home?#/

Introduction to A... AWSAppStream Cloud-Liaison AWS DevOps Launch Meeting - ... Jenkins_stuff KFS-DevOps Azure Training and Clou... Projects GIT ref D

Services Resource Groups

Support Center

Account number: 101334791012
Support plan: Enterprise [Change](#) | [View support plans](#)

My support cases


Health events 0

Recent cases sorted by created date. [Create case](#)


Subject	Case ID	Created (UTC-5)	Severity	Status
Limit Increase: EC2 Instances	5301027601	2018-08-20T12:59	General question	Resolved
bootstrap actions and s3:// paths	5300723871	2018-08-20T10:54	General guidance	Resolved

[View all support cases](#)


Recommended videos



[How can I set up HTTP to HTTPS redirections on ELB using A...](#)



[How can I use Cost Explorer to analyze my spending and usage?](#)



[What are some reasons why I can't use SSH to connect to an EC...](#)

Recommended for you

- [How do I transfer ownership of an Amazon EC2 instance to a different AWS account?](#)
- [How do I transfer ownership of Amazon S3 objects to a different AWS account?](#)
- [How do I purchase an Amazon EC2 Reserved Instance?](#)
- [How do I troubleshoot problems connecting to my EC2 Linux instance using SSH?](#)
- [How do I troubleshoot problems using Remote Desktop to connect to my Amazon EC2 Windows instance?](#)
- [I no longer need an AWS account and its resources. What action should I take?](#)
- [How can I troubleshoot issues with my EC2 Windows instance by using the EC2Rescue tool?](#)

Popular services tagged in articles

[EC2](#) [Account / Billing](#) [RDS](#) [ELB](#) [Lambda](#)

[View all Knowledge Center Articles](#)

Trusted Advisor

Cornell AWS Enterprise Agreement Enterprise Support

→ ↻ https://console.aws.amazon.com/support/cases#/create

Apps Introduction to A... AWSAppStream Cloud-Liaison AWS DevOps Launch Meeting - ... Jenkins_stu

aws Services Resource Groups shib-adr

This is the new Support Center experience for managing cases. We've upgraded the pages for improved clarity and usability. If you would like to make use of t

Account number: 101334791012
Support plan: Enterprise [Change](#) | [View support plans](#)

Support Center > Create case

Create case Info

Account and billing support
Assistance with account and billing-related enquiries

Service limit increase
Requests to increase the service limit of your AWS resources

Technical support
Service-related technical issues and third-party applications

Case classification

Q

- General guidance
- System impaired
- Production system impaired
- Production system down
- Business-critical system down

Select or search ▼

Case description

Subject

Brief summary of the question or issue

Maximum 250 characters (250 remaining)

Description

Detailed account of the question or issue

Cornell AWS Enterprise Agreement Enterprise Support

Severity	Response*	Examples for Reference
Business-critical system down	15 min	Major outage – loss of control of the entire enterprise, entire customer base, or have the potential for a large revenue loss.
Production system down	1 hour	You can't work around the problem, and your business is significantly impacted. Important functions of your application are unavailable.
Production system impaired	4 hours	You can't work around the problem. Critical functions of your application are impaired or degraded.
System impaired	12 hours	You can work around the problem. Non-critical functions of the application are behaving abnormally; a time-sensitive development question.
General guidance	24 hours	You have a general development question or want to request a feature.

AWS ITIL Issue Priority Matrix				
Urgency + Impact = ** Severity		Urgency		
		Low	Medium	High
Impact	Low	Low	Normal	High
	Medium	Normal	High	Urgent
	High	High	Urgent	Critical

* **Response** time refers to time for first contact, resolution is always provided on best effort basis

** **Severity** is a function of Urgency and Impact, Use this matrix to determine the right severity for your situation

Cornell AWS Enterprise Agreement Enterprise Support

If more detailed information is needed from AWS support for planning architecture or services in AWS, like DR planning etc., we are available to connect to specific AWS support staff.

cloud-support@cornell.edu

<https://confluence.cornell.edu/display/CLOUD/2018-03-28+Good+News%21+AWS+Enterprise+Support>

Upcoming On-Campus Training & Workshops

Container Technologies

- March 5 - 1-4pm, Weill 321
 - Formal AWS Training on ECS, EKS, Fargate
- March 6 - 9-2:30, Weill 221
 - Campus Container Users Discussions
 - Kubernetes presentation
 - AWS Presentation on realistic deployment using ECS, EKS, Fargate
 - Open Discussion with AWS SMEs and Solutions Architects

Watch SD-SIG & Cloud-Community mailing lists for registration info

See: [Cloud Team Wiki : Container Tech Info](#)

References : Resources for AWS updates, news, training

- [Jerry Hargrove Cloud Diagrams](#)
- DataSync
 - [re:Invent 2018 DataSync slideshare](#)

Periodic Table of Amazon Web Services

by @awsgeek

Legend		Service Categories																																			
<ul style="list-style-type: none"> Analytics Application Integration AR & VR AWS Cost Management Blockchain Business Applications 		<ul style="list-style-type: none"> Compute Customer Engagement Database Developer Tools End User Computing Game Tech 			<ul style="list-style-type: none"> Internet of Things Machine Learning Media Services Migration & Transfer Mobile Management & Governance 			<ul style="list-style-type: none"> Network & Content Delivery Robotics Satellite Storage Security, Identity & Compliance 																													
amazon A athena	aws S3 simple storage service	aws Sg storage gateway	amazon Cs cloudsearch	aws Gs ground station	amazon Mr map reduce	aws G glue	amazon Es elasticsearch	aws Lf lake formation	aws Ce cost explorer	amazon Ax alexa for business	amazon Cs elastic container service	aws L lambda	amazon Co connect	aws Cb codebuild	amazon Au aurora	amazon Ds relational database service	aws I iot core	aws Dd iot device defender	aws Ac auto scaling	aws Ms managed services	aws Mc elemental mediaconnect	aws Dm database migration service	amazon Po pinpoint	amazon 53 route 53	amazon Fx fsx for lustre	aws Wa well-architected tool	aws Lm license manager	amazon Et elastic transcoder	aws Mh migration hub	aws Am amplify	amazon V virtual private cloud	amazon Bs elastic block store					
amazon K hinesis	aws Sf step functions	aws Bu budgets	amazon Ch chime	amazon Ks elastic container service for kubernetes	aws O outposts	amazon Pi pinpoint	aws Cc codecommit	amazon D dynamodb	amazon Rs redshift	aws Os iot freertos	aws Dm iot device management	aws Cf cloudformation	aws Ow opsworks	aws Mv elemental mediaconvert	aws Ds datasync	aws As appsync	amazon PI vpc privatelink	amazon Fw fsx for windows file server	amazon Ka managed streaming for kafka	amazon Mq activemq	aws Cu cost & usage report	amazon Wm workmail	amazon Ls lightsail	aws Sa serverless application repository	amazon E simple email service	aws Cd codedeploy	amazon Do documentdb	amazon Ti timestream	aws Ig iot greengrass	aws Ev iot events	aws Ct cloudtrail	aws Ph personal health dashboard	aws MI elemental medical intelligence	aws Sm server migration service	aws Df device farm	aws Am App Mesh	amazon Gl s3 glacier
aws Dp data pipeline	aws Ap appsync	amazon Su sumerian	amazon Cr elastic container registry	aws F fargate	aws Rm robomaker	aws Cg cloud9	aws Sd tools & sdks	amazon Ol quantum ledger db	amazon Ly lumberyard	aws Bu iot button	aws Dc iot partner device catalog	aws Cm console mobile app	aws Ta trusted advisor	aws Mt elemental mediatailer	amazon Wd workdocs	amazon Wo worklink	amazon Ws workspaces	amazon As appstream 2.0	amazon R redshift	amazon N simple notification service	aws Ri reserved instance reporting	amazon C elastic cloud compute	aws Ba batch	aws Lb elastic load balancing	aws Cs codestar	aws Cp codepipeline	amazon Ec elasticsearch	aws Ms database migration service	aws Ic iot 1-click	aws Sw iot site-wise	aws Co config	aws Sc service catalog	aws Mp elemental mediapackage	aws Sn snow family	aws Ga global accelerator	aws Cm cloud map	aws Ba backup
amazon Sm sagemaker	amazon Co comprehend	amazon Ei elastic inference	amazon Fc forecast	amazon Lx lex	amazon Pe personalize	amazon Po polly	amazon Rk rekognition	amazon Gt sagemaker ground truth	amazon Tx textract	amazon Tr translate	amazon Ta transcribe	aws DI deep learning amis	aws DI deeplens	aws Dr deepracer	aws If inferentia	aws Mx apache mxnet on aws	aws Tf tensorflow on aws	aws Im identity & access management	amazon Cd cloud directory	amazon Co cognito	amazon Gd guardduty	amazon I inspector	amazon M macie	amazon Ar artifact	aws Cm certificate manager	aws Hs cloudhsm	aws Ds directory service	aws Fm firewall manager	aws Km key management service	aws O organizations	aws Sm Secrets manager	aws Sh security hub	aws S shield	aws Ss single sign-on	aws Wf web application firewall		

THE END