Consolidated Audit Trail

Industry Member Connectivity and Onboarding Update

Agenda

▸ Summary of CAT Interfaces and Connectivity Methods

▸ Overview of CAT Interface Methods and CAT Connectivity Methods

▸ CAT Reporter Portal

▸ CAT File Transfer

▸ Private Line Connectivity

▸ AWS PrivateLink

▸ Onboarding & Testing Timelines

▸ Availability & Support

▸ Q&A

Summary of CAT Interfaces and Connectivity Methods

Connectivity Methods	Interface Methods	
	CAT File Transfer	CAT Reporter Portal
Private Line provided by a MNSP	Yes	Yes
AWS PrivateLink	Yes	Yes
CAT Secure Reporting Gateway	No	Yes

FINRA CAT Connectivity Supplement for Industry Members posted at https://catnmsplan.com/registration/

CAT Data Submission and Feedback

CAT Data Submission and Feedback	CAT File Transfer	CAT Reporter Portal
Submission of CAT Events and Resubmission of Rejected Files/Records, Corrections and Deletions	✓	✓
File Status Retrieval	✓	✓
Reporting Statistics		✓
Interactive CAT Reportable Event Entry		✓
Error Feedback	✓	✓
Corrections Feedback		✓
Account Maintenance		✓
Establishment of Reporting Relationships and ATS Order Types		✓

CAT Reporter Portal

CAT Interface Methods – CAT Reporter Portal

- **Web interface utilizing secure encryption protocols (HTTPS/TLS) and multi-factor authentication (MFA) for submissions (by either direct entry or manually uploaded file), rejections, corrections, and compliance reports**

- **May be accessed via the Private Line, the AWS PrivateLink or the CAT Secure Reporting Gateway**

- **Supports a browser-based, manual upload of files (File size limit of 100,000 records)**

- **Reporter Portal requirements include:**

  - TLS 1.2 requiring at a minimum NIST compliant 128 bit ciphers

  - HTML5 Compatible browsers, including: Chrome, Firefox, and Safari

  - Multi-factor authentication setup (more details on the Multi-factor authentication setup and required software will be published in a future version of the FINRA CAT Industry Member Onboarding Guide)

CAT Secure Reporting Gateway

- **IMs and CRAs using public lines will only be able to access the CAT Reporter Portal by establishing an authenticated, encrypted connection (SSL VPN) through the CAT Secure Reporting Gateway (SRG).**
  - **The SRG requires multi-factor authentication (MFA) to establish a secure, encrypted session before accessing the CAT Reporter Portal.**
  - **Meets all Plan requirements for data connectivity and encryption, specifically;**
    - Network isolation limiting access to only authorized endpoints
    - Strong authentication using MFA
    - Encryption of the data in transit
  - **No limit in choice of Internet Service Providers and no specialized client software is required to be installed other than a modern web browser (*e.g.* Chrome, Safari, Firefox).**
  - **Provides refined control over the web applications through policy controls and content inspection of the application data.**
  - **Using the SRG, the client computer never communicates directly with the CAT web application.**

CAT Reporter Portal & Manual File Upload

▸ Manual File Upload functionality accelerated and will be available at the start of Industry Test on December 16

▸ Available for Reporter Portal Entitled Users – an SFTP account is NOT required

▸ High-Level Requirements:
  ◦ Files MUST meet the Technical Specification requirements (naming, syntax, compression requirements, etc.)
  ◦ Files must be <=1GB in size AND total record count may not exceed 100,000
  ◦ Meta and Data files are BOTH required – Data files must be submitted prior or at the same time as Meta Files
  ◦ No limit to the number of files submitted using File Upload; however a limit of 10 files for a single submit, with max limit of 5GB
  ◦ File and Data Integrity Feedback files submitted using Manual File Upload will also be available

▸ A User Guide and demo will be available in alignment with upload testing

CAT File Transfer

CAT Interface Methods – CAT File Transfer

- **Automated, machine-to-machine interface utilizing the Secure File Transfer Protocol ("SFTP") for file submissions, acknowledgements, rejections and corrections**

- **May be accessed via Private Line or AWS PrivateLink**

- **SFTP requirements include:**

  - SSH Key Exchange Algorithms

    - diffie-hellman-group-exchange-sha256

  - SSH Ciphers

    - aes128-ctr, aes192-ctr, aes256-ctr

  - SSH MAC Algorithms

    - hmac-sha256, hmac-sha256@ssh.com

  - A connection with bandwidth appropriate for the file sizes submitted

Private Line Connectivity

Connectivity Methods – Private Line

- **Private Lines provide connectivity to both CAT Interface Methods: CAT file Transfer (SFTP) and CAT Reporter Portal**

- **IMs and CRAs must engage a managed network service provider (MNSP) to establish private line connectivity into the FINRA CAT system**

- **IMs and CRAs that prefer the use an extranet network service provider may continue to do so over a MNSP connection. Financial implications should be discussed with their MNSP of choice.**

CenturyLink	BT Radianz

• Century Link offers bandwidths ranging between 10 Mbps and 1 Gbps of throughput with redundant connectivity options
 	
• Circuit delivery times can range widely and depend on the provider's network status at any locations
 	
• IMs and CRAs may engage CenturyLink to begin the process of establishing private line connectivity by:
   o Via existing sales contacts
   o Email at FINRA_CAT-Services@centurylink.com
   o Phone at (888) 870-8402
	• BT Radianz offers bandwidths ranging between 10 Mbps and 1 Gbps of throughput with redundant connectivity options.
	
	• Existing BT Radianz customers may benefit from leveraging existing BT Radianz connections to achieve connectivity.
	
	• IMs and CRAs may engage BT Radianz to begin the process of establishing private line connectivity by:
	   o Via existing sales contacts
	   o Email at FINRACAT@bt.com
	   o Phone at Sergio Angeloni – (646) 236-6183 or Timothy Chapman – (630) 923-2163

CenturyLink Installation Intervals

- The installation date is dependent on obtaining accurate complete data from Industry Members in a timely fashion

- Orders requiring demarc expansion to the building may incur an additional 30 to 65 business days' lead times

- Intervals are estimates and represent business days from customer signed date to install date

MPLS - Ethernet	Business Days
On-Net or via Cross Connect	35
Off-Net	90

*On-Net – "Lit" facilities on CTLs network

*Off-Net – Any site not on CTLs network requiring construction or third-party access loop

BT Radianz Installation Intervals

- The installation date is dependent on obtaining accurate complete data from Industry Members in a timely fashion

- Orders requiring demarc expansion to the building may incur an additional 30 to 65 business days' lead times

- Intervals are estimates and represent business days from customer signed date to install date

- FINRA CAT has negotiated baseline rates for BT connectivity. These rates are based on Metro area connections. Non-Metro area connections may incur additional costs. Details should be discussed directly with BT Radianz.

MPLS - Ethernet	Business Days
On-Net – w/available capacity	10
Off-Net via Cross Connect	30
Off-Net or capacity upgrade	67

*On-Net – "Lit" location on BT's network.

*Off-Net – Any customer that is not currently connected to BT's network new circuit provisioning, construction or third-party access loop .

AWS PrivateLink Connectivity

Connectivity Methods – AWS PrivateLink

- **IMs and CRAs with existing operations and data processing presence in the AWS cloud (VPC) may establish a cloud-to-cloud connection to CAT using he AWS PrivateLink service for an associated AWS fee**

- **An AWS PrivateLink connection enables communication from an Industry Member's AWS VPC to the FINRA CAT VPC without traversing the public Internet <u>(see Appendix A)</u>**

- **IMs and CRAs interested in AWS PrivateLink should contact the FINRA CAT Help Desk**

  - Establishing AWS PrivateLink connectivity from an Industry Member's and CRA's VPC in the US-East-1 region to the FINRA CAT VPC can be accomplished by executing an AWS CloudFormation template

  - Industry Members and CRAs will need to provide their AWS account numbers to FINRA CAT in order to facilitate PrivateLink access

  - PrivateLink will be supported in the Industry Test environment starting on January 27

More information on AWS PrivateLink can be found at:
https://aws.amazon.com/privatelink/
More information on the AWS Cloud Formation service can be found at:
https://aws.amazon.com/cloudformation

How AWS PrivateLink Works At FINRA CAT

For FINRA CAT Industry Members (IMs) that already have presence in AWS and are comfortable using AWS managed services:
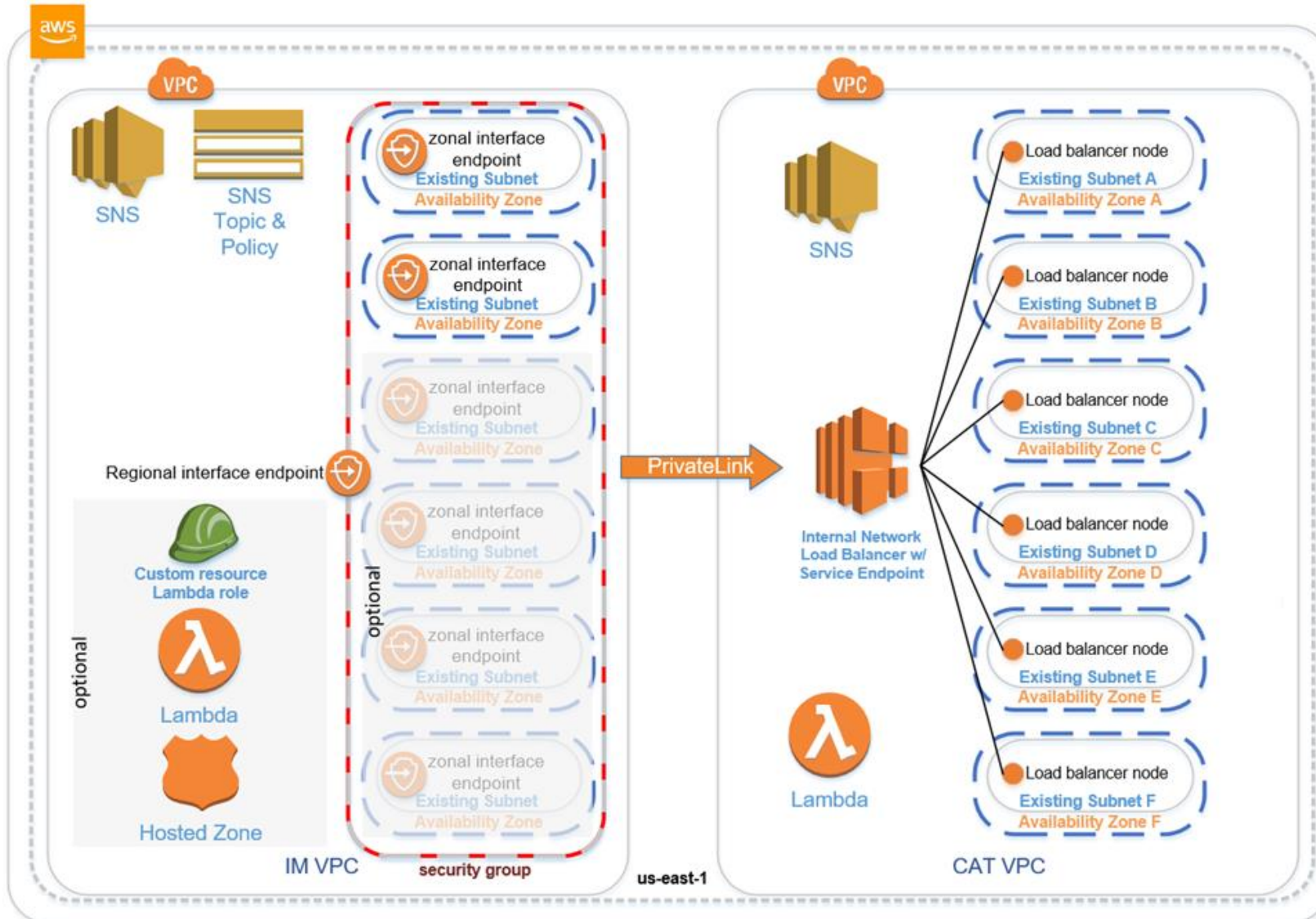
▸ FINRA CAT aims to enable multiple connectivity "Endpoints" for the following services:
  ◦ The Authorization interface for all FINRACAT Services
  ◦ The CAT Reporter Portal
  ◦ The CAT SFTP File Transfer Interface

▸ IM's can connect their existing VPCs to FINRA CAT services in AWS in a secure and scalable manner.

▸ FINRA CAT will provide automation to create an interface VPC endpoint for a FINRA CAT service in your own VPC. This creates an Elastic Network Interface (ENI) in your subnet with a private IP address that serves as an entry point for traffic destined to the FINRA CAT service.

▸ FINRA CAT AWS PrivateLink is designed to work in all three of FINRA CAT's availability zones ("Endpoints" are associated with individual AWS availability zones).

Using FINRA CAT AWS PrivateLink

▸ IMs and CRAs who use AWS PrivateLink to connect to FINRA CAT Endpoints are responsible for:

- Setup of their own AWS VPCs and internal data connectivity, and internal data transfer into and out of their VPCs including their own OnPrem environments.

- Setup of DNS and web traffic management in and out of their own VPCs.

- Execution of FINRA CAT "CloudFormation" scripts to connect their own VPC to FINRA CAT Endpoints.
  - Must select between option of small, medium, or large based on individual bandwidth and AWS availability zone connectivity needs.

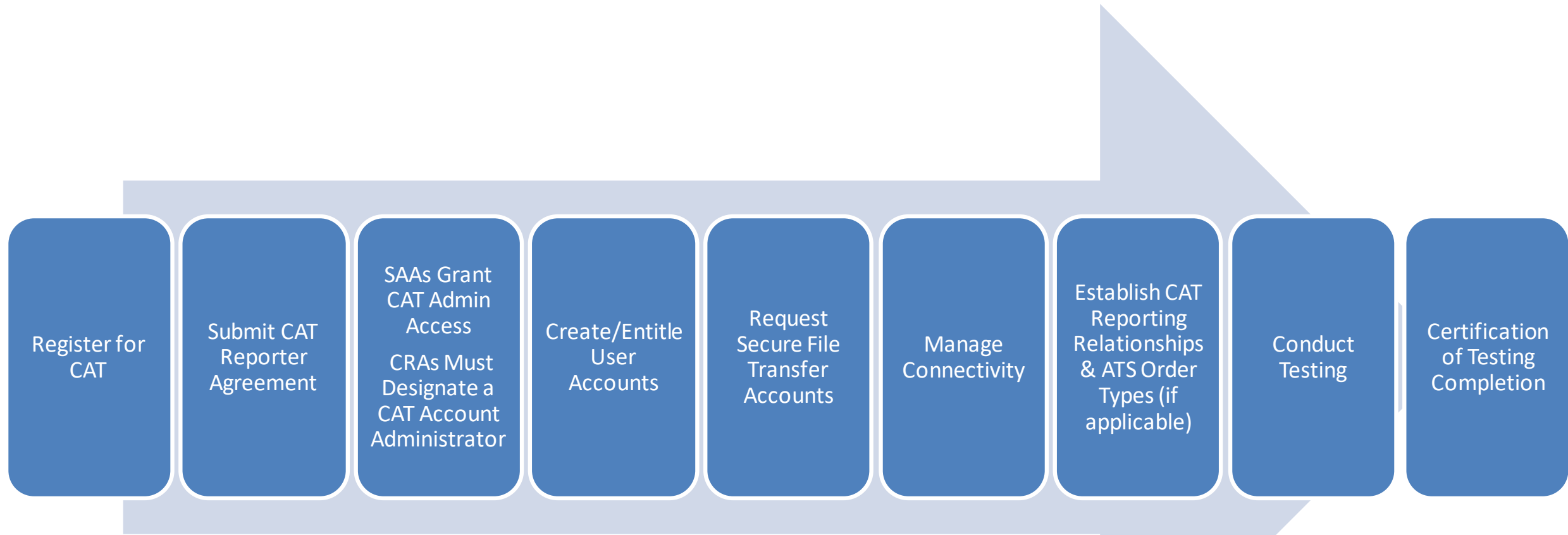- Responsible for their own AWS billing for AWS Services.

AWS PrivateLink High Level Architecture

Onboarding and Testing Timelines

Onboarding Steps

| Register for CAT | Submit CAT Reporter Agreement | SAAs Grant CAT Admin Access

CRAs Must Designate a CAT Account Administrator | Create/Entitle User Accounts | Request Secure File Transfer Accounts | Manage Connectivity | Establish CAT Reporting Relationships & ATS Order Types (if applicable) | Conduct Testing | Certification of Testing Completion |

*** Additional information related to Registration and Onboarding may be found at
https://catnmsplan.com/registration/ ***

Onboarding – Account Administration

▸ Each Industry Member has **ONE** designated Super Account Administrator (SAA) who will be granted CAT account administration once firm registers and submits Agreement. SAAs do not need to request CAT access.

▸ In addition to Registration and Agreement, CAT Reporting Agents must designate at least one CAT Account Administrator (AA) by submitting, via DocuSign, a CAT Account Administrator Entitlement Form, available at **https://catnmsplan.com/registration**

▸ Roles serve as the main points of contact for the FINRA Entitlement Team

▸ Ability to create, delete and maintain user accounts

▸ SAAs may create CAT Account Administrators who manage CAT entitlement for other users within the organization

▸ Responsible for verifying all user accounts for their organization and must comply with the FINRA Entitlement User Account Certification Process

Onboarding – Account Administration

▸ Request Secure File Transfer Accounts by submitting, via DocuSign, a CAT Entitlement Secure File Transfer Protocol (SFTP) Account Form available at **https://catnmsplan.com/registration**

Testing Timeline for Production Readiness

Date	Event
October 15, 2019	Private Line available for network testing (Century Link)
November 4, 2019	CAT Secure Reporting Gateway available for network testing
November 18, 2019	CAT Reporter Portal Opens for CAT Reporting Relationships and ATS Order Type Registration
December 16, 2019	CAT Industry Test Environment opens for 2a/2b machine-to-machine testing of file submission and data integrity validations and CAT Reporter Portal manual file upload/submission
January 27, 2020	AWS PrivateLink available for 2a/2b machine-to-machine file submission and CAT Reporter Portal
February 24, 2020	CAT Reporter Portal Industry Test Environment opens for error correction and feedback
April 6, 2020	Industry Members and CAT Reporting Agents must complete production readiness testing for 2a reporting
April 20, 2020	Production Go-Live for Equities 2a file submission and data integrity validations
May 3, 2020	Industry Members and CAT Reporting Agents must complete production readiness testing for 2b reporting
May 18, 2020	Production Go-Live for Options 2b file submission and data integrity validations

How to Ask a Question during Today's Call

- **For participants using computer audio:**
  - Click the "Participants" button at the bottom of the app window, then the "Raise Hand" button at the bottom of the participants window.
  - A visual prompt will indicate that your line has been unmuted.

- **For participants using phone audio:**
  - Enter *9 on your phone keypad.
  - An audio prompt will indicate that your line has been unmuted.

FINRA CAT Helpdesk

Questions may be directed to the FINRA CAT Helpdesk at 888-696-3348 or help@finracat.com
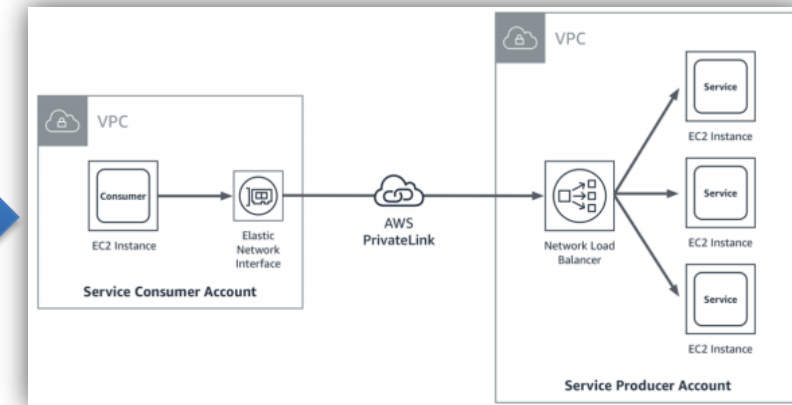
Appendix A – AWS PrivateLink

What Is AWS PrivateLink

- Amazon Virtual Private Cloud (Amazon VPC) gives AWS customers the ability to define a virtual private network within the AWS cloud to build services securely and keep data internal.

- AWS PrivateLink allows AWS users to connect and transfer data across these VPCs within their own organization or with other organizations that also use AWS VPCs.

- AWS PrivateLink uses connectivity over Transmission Control Protocol (TCP) vice internet (public IP address) to ensure internal and secure connectivity.

- AWS PrivateLink is NOT intended to be a network traffic router across different data centers.

Use of VPCs
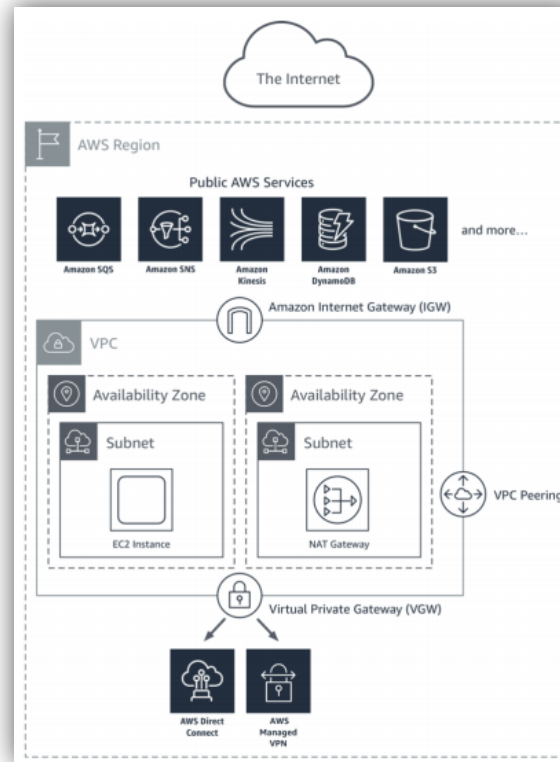
Use of VPCs with PrivateLink

Why Use AWS PrivateLink

Use of Private IP Addresses for Traffic

- AWS PrivateLink uses Private IP addresses and security groups to connect to services.

- All services appear as if they are internal to your own VPC even if AWS users connect to other AWS users VPCs.

Scalable Managed Service

- AWS PrivateLink is an AWS managed service that scales based on usage needs.

- AWS users pay for usage and can terminate connectivity at any time with no long term contracts.

Simplify Network Management

- Removes the need to setup complex networking.

- Simplifies network topology by removing the need to create route tables.

Allow Service Specific Connectivity

- Use of "Endpoints" allows AWS users to expose specific service connectivity via PrivateLink.

- Endpoints are individually scalable and AWS users can create multiple endpoints.