

EDGE Server Provisioning Computer Based Training (CBT) Text-Only Version

1. Introduction

1.1 Distributed Data Collection for Reinsurance (RI) and Risk Adjustment (RA): Provisioning

Welcome to the text-only version of the EDGE Server Provisioning Computer Based Training (CBT). The purpose of this training is to provide issuers with cost benefits of Amazon Web Services, or AWS servers and On-Premise servers, provide issuers and Third Party Administrators, or TPAs, guidance on On-Premise EDGE server set-up, and focus on the key technical steps required for On-Premise EDGE server set-up.

1.2 Intended Audience

The intended audience for this training includes: Amazon and On-Premise Server Issuers, AWS and On-Premise, and TPAs and Support Vendors.

1.3 Topics to Cover

This training will cover the following topics - AWS Infrastructure Overview, Amazon EDGE Server Cost Considerations, Overview of the Amazon EDGE Server Provisioning Process, Downloading and Configuring PuTTY, Overview of On-Premise EDGE Server, On-Premise EDGE Server Administration and Costs, On-Premise EDGE Server Infrastructure & Configuration, Overview of the On-Premise EDGE Server Set-up Process, and Resources.

2. AWS Infrastructure Overview

2.1 Amazon EDGE Server

In selecting and deciding between an Amazon EDGE server or an On-Premise EDGE server, there are key decisions to consider in regards to both the Amazon EDGE server and the On-Premise EDGE server. The Amazon EDGE server set up process is automated and has no hardware requirements. The software requirements for the Amazon EDGE server are in the operating system, and are included in the Amazon EDGE server purchase. The security responsibilities for the AWS EDGE server are shared between Amazon and issuers. Issuers can also leverage Amazon's existing infrastructure, and have an added scalability capacity available when selecting an Amazon EDGE server.

2.2 Amazon EDGE Server Infrastructure

The Amazon Simple Storage Service, also known as S3, provides a highly durable and available storage for a variety of content, ranging from web applications to media files.

The Amazon Elastic Compute Cloud, or Amazon EC2, is a web service that provides resizable compute capacity in the cloud. Amazon Identity and Access Management, or IAM, enables secure control access to AWS and resources for issuers.

The Amazon EDGE server will be loaded with Linux, Java, MySQL and the EDGE server application as part of the Centers for Medicare & Medicaid Services (CMS) provisioning process.

2.3 CMS & Amazon EDGE Server

CMS will provide issuers a script to deploy the infrastructure into issuers' AWS space. CMS will then host a shared location where the EDGE server will download the initial software and updates. The AWS EDGE server infrastructure is available for download in the Registration for Technical Assistance Portal (REGTAP) Library at <https://www.REGTAP.info/>.

2.4 Amazon EDGE Server Infrastructure

The Amazon EDGE server will be provisioned in the AWS cloud environment in one (1) of the United States East and West Regions. Amazon has confirmed that all server data remains within the United States. AWS offers an agile and cost-effective way to process data for Risk Adjustment, or RA and Reinsurance, or RI. Issuers will incur server costs during 'uptime'. 'Uptime' costs are incurred whenever the server is up and running and data is transferred in and out of the storage. To meet the Health Insurance Portability and Accountability Act, or HIPAA requirements, and as required by the Amazon Business Associate Agreement (BAA), a dedicated environment will be provided with security and privacy safeguards. Access is controlled by the host, either TPAs or issuers, with permissions managed by the host. The host can restrict access to the server as required.

2.5 Amazon EDGE Server Requirements

The hardware and internet requirements for Amazon EDGE servers are: Issuers are able to use existing workstations to access AWS. Issuers must have reliable internet connectivity to access AWS and Amazon EDGE servers do not require the use of specific Internet Protocol (IP) addresses. The EDGE server software requirements are: Red Hat Linux, MySQL and Java. PuTTY, an open source Secure Shell, otherwise known as SSH, telnet client and third party certificates will need to be purchased. All browsers may be utilized to access the Amazon web console.

2.6 Amazon EDGE Server Administration

An Amazon account will accommodate up to 25 EDGE server instances, in which multiple issuers can be supported in a single AWS account. Issuers are responsible for firewall, Network Address Translation, or NAT, and all other network configurations to support the Amazon EDGE server. IP tables will be initially configured to allow traffic on port 22. Configuration of the initial AWS Virtual Private Cloud, or VPC, the network layer, will be provided during provisioning. Issuers may add additional firewall rules, NATs or network configuration as they see fit.

2.7 Amazon EDGE Server Administration (Continued)

Amazon EDGE server solutions and the Lightweight Directory Access Protocol, or LDAP, is being replaced by Identity and Access Management, or IAM.

Issuers should have resources versed in Linux Operating System (OS) and MySQL who will be responsible for the management of the MySQL database. This management includes patching the MySQL database and resolving issues related to general database maintenance.

3. Amazon EDGE Server Cost Considerations

3.1 Amazon EDGE Server Cost

The monthly cost of the Amazon EDGE server will be unique to each issuer. The base price provides a secured data facility, storage that is 99.999% available, space for servers, a firewall to protect the environment, and a VPC. Issuers will incur additional charges for support, storage and puts or gets, which generally consists of the number of files sent in and out of the S3 bucket with the first million of each free per month, as well as a data transfer charge for data coming and going out of the Amazon cloud. Issuers should note that transfers within the cloud are free.

3.2 Server Size Estimation

For the Amazon EDGE server, specific guidelines were used in developing server size estimates.

Server Size Estimation		
Size	Number of Enrollees	Claims Processing Throughput per Hour
Small	1,000,000	500,000
Medium	5,000,000	1,000,000
Large	20,000,000	2,000,000

3.3 Amazon EDGE Server Estimates

The estimated AWS server size is dependent if the server size is small, medium or large, the AWS Instance size, vCPU, RAM and the estimated total monthly cost. It is worth noting that a \$2.00 per hour fee is charged in addition to standard processing fees for each dedicated instance. For more accurate calculations specific to your organization, reference the AWS Simple Monthly Calculator at the following Web address. <http://calculator.s3.amazonaws.com/index.html>.

4. Overview of the Amazon EDGE Server Provisioning Process

4.1 Amazon EDGE Set-up Summary

The Amazon EDGE set-up summary contains three (3) primary steps: Creating an AWS account; requesting an Amazon EDGE server from CMS, and then confirming and provisioning the EDGE server and receiving updates. Issuers may create an AWS account at any time. The EDGE server is protected by a short lived access key. Issuers should not generate access keys until notified by CMS. Issuers may request an Amazon EDGE server from CMS and confirm and provision the EDGE server at any time. Job aids can be found on in the REGTAP Library at <https://www.REGTAP.info/> with more information on these processes. The initial step for establishing an Amazon EDGE server is to create an AWS Account. This may be performed at any time. Issuers will be required to enter credit card information to set up payment. Issuers will not be billed at this point in time and will only be billed if they choose to purchase additional AWS support or functionality. Issuers may contact Amazon to set up alternative payment options. Issuers should select their level of support during initial account setup. Issuers can elect to change their level of support at any time through their Amazon account.

Once an Amazon EDGE server request is approved by CMS, the EDGE server is automatically provisioned. This provisioning process is triggered by CMS, approving the registration request submitted through the EDGE server registration site. The Issuer Submitter's request status is updated to designate that provisioning has occurred and was successful. Once provisioning is complete, the Issuer Submitter's request status is updated in the EDGE registration site and the issuer is able to log in to AWS and begin processing files. When a request is approved by CMS, the Issuer Submitter's request status is updated to a pending provisioning status. This indicates that the request is ready for provisioning. The request displays with a status of provisioning in progress. When provisioning is complete, the status will update to provisioned. This indicates that the Amazon EDGE server has connected with the Phone Home service for the first time.

In the event the provisioning script does not complete successfully, the Issuer Submitter's request status will update to provisioning failed. The Issuer Submitter will then need to contact their Financial Management (FM) Service Representative in the event of a provisioning failed status.

5. Downloading and Configuring PuTTY

5.1 Download PuTTY and Save your Private Key

Downloading PuTTY and saving your private key is a critical step in provisioning your server.

Step 1: Download PuTTY from www.putty.org.

Step 2: Open and run the puttygen.exe file.

Step 3: Click 'Load' and then select the Key Pair file.

Step 4: Click 'OK' to generate the file in .ppk format.

Step 5: 'Save private key' button without a passphrase. You may save the key with a passphrase if so desired.

5.2 Run and Configure PuTTY

Take these 11 steps to run and configure PuTTY:

Step 1: Go to the AWS console and click 'Services.' Next, click 'All AWS Services', and finally click 'EC2.'

Step 2: Click 'Instances.'

Step 3: Find and select your EDGE server instance from the list. The correct server instance should have an instance state set to running and can be identified by the issuer Health Insurance Oversight System, or HIOS ID, in the 'Name' column on the right.

Step 4: Locate and copy your server's public IP address. This address will be used later in the process.

Step 5: Locate and run the PuTTY.exe file downloaded to your computer.

5.3 Run and Configure PuTTY

Step 6: After running PuTTY.exe, the PuTTY configuration window will be displayed.

Step 7: Select the connection type 'SSH' and enter 'ec2-user@ your IP address' into the Host Name or IP address field.

Step 8: Click the 'SSH' dropdown from the category list on the left side of the PuTTY configuration window and select 'Auth.'

Step 9: Click 'Browse' on the Authentication options window.

Step 10: Locate the PuTTY Private Key created and saved earlier in the process and click 'Open.'

Step 11: Once the PuTTY Private Key file is located, click 'Open' in the PuTTY configuration window.

5.4 Connect and Confirm AWS EDGE Server Functionality

To log in to the server for the first time, enter the password 'e-d-g-e-s-e-r-v-e-r.' Please enter this as one (1) word with no spaces.

Please note that the cursor will not move when typing in the password characters. This occurs only when entering passwords. You will be prompted to enter a new password for future logins. After entering your password, the PuTTY session will close automatically.

Issuers should now log back into your server using your new password. Once you log back in, enter 'edge version' and press 'enter'.

5.5 Turn off your AWS EDGE Server

To avoid continuous usage charges, remember to turn off your server instance when not in use. To turn off your server:

Click 'Instances' on the left-hand side of the screen, then click 'Actions'.

Then scroll down and click 'Stop.' It is extremely important to note that to stop the server, do not select 'Terminate.' Selecting 'Terminate' will shut down the server and you will no longer have access to the server once it is terminated.

5.6 Turn off your AWS EDGE Server

After selecting 'Stop', Issuers will receive a notification message asking for confirmation to turn off the EDGE server. Click 'Yes, Stop' in the window.

6. Overview of On-Premise EDGE Server

6.1 On-Premise EDGE Server

CMS is offering an On-Premise EDGE server to issuers. Issuers will be able to install and run the EDGE server software in a location that best fits their operation-run model. The On-Premise EDGE server can run on physical hardware on a virtual server farm or in another cloud provider's space.

6.2 On-Premise EDGE Server

This screen contains an overview of the key features of the On-Premise EDGE server. Cost considerations should be taken into account when deciding upon the EDGE server options of AWS or On-Premise. The server setup for the On-Premise EDGE server is manual. The hardware requirements require a physical or virtual server. The software requirements require the issuer to purchase operating system licenses. The security concerns are owned entirely by the issuer. The issuer will provide EDGE server infrastructure based on CMS specifications. Scalability is dependent on the issuer's capabilities. The issuer installs the EDGE server OS and initiates the CMS script to install the EDGE server application, with MySQL and Java. The network connectivity requires issuers to open ports 443 and 22.

7. On-Premise EDGE Server Administration and Costs

7.1 On-Premise EDGE Server – Cost Considerations

Issuers should consider the following when estimating costs for their On-Premise EDGE server.

Hardware – Issuers must obtain a physical server or set up a virtual server. Issuers should note that CMS cannot provide any recommendations on hypervisor and virtual machine configurations, for example, dedicated CPU, dedicated RAM, et cetera.

Software – The EDGE server requires Red Hat Enterprise Linux (RHEL) Version 6.7 software.

Issuers should also account for staff resources for operations, security, maintenance, support and database administration.

7.2 On-Premise EDGE Server Administration

Issuers who select On-Premise EDGE servers may elect to manage their server by using an in-house team of system administrators or outsource the management of the server to a centrally-located data center while retaining full access and control of the data. Issuers should have resources versed in RHEL OS Version 6.7 and MySQL administration, who will be responsible for the management of the MySQL database. Resources will need to perform MySQL patching and resolve issues related to general database maintenance.

7.3 On-Premise EDGE Server Administration (Continued)

Issuers are responsible for firewall, NAT and all other network configurations to support the On-Premise EDGE server. If IP tables are configured, the EDGE server application will require at minimum ports 443 and 22. Issuers may add additional firewall rules, NATs or network configurations if so desired.

7.4 Install & Deploy On-Premise EDGE Server Application

CMS will review and approve On-Premise EDGE server requests. Once the request has been approved, the issuer will receive a link to download a .zip file containing a bootstrap script to run and install the application. The application will be pulled from an S3 bucket from the CMS/AWS environment. Running the script is a manual process initiated by the issuer. The issuer will then be given a property file and will run the script with the property file location as a parameter.

8. On-Premise EDGE Server Infrastructure & Configuration

8.1 On-Premise EDGE Server Infrastructure

Issuers have the option of choosing between a physical server or a virtual server. A virtual cloud provider other than Amazon may be used. Under the current design, issuers are restricted to one (1) server per Issuer ID in HIOS unless they virtualize their physical box. Issuers have the option of using a hypervisor, such as VMWare or XEN for virtualization. Enrollment, supplemental, medical and pharmacy files will be directly uploaded to the local directory on the EDGE server.

8.2 On-Premise EDGE Server Ecosystem

CMS will host a shared location from which the EDGE server will download the initial server software and updates. Documentation for the On-Premise EDGE server ecosystem is available in the REGTAP Library at <https://www.REGTAP.info/>

8.3 On-Premise EDGE Server Configuration

The following table provides examples of hardware server configuration specifications based on organizational size. This table displays server configuration, based on Intel CPUs, provides recommendations for a small, medium or large server based on the number of enrollees that the server anticipates hosting data for.

Table 1: Server Configuration *Based on INTEL CPUs			
	Small	Medium	Large
Number of Enrollees	1,000,000	5,000,000	20,000,000
*Claims Processing Throughput per hour	500,000	1,000,000	2,000,000
Processor	2 x 4-Core	2 x 8-Core	4 x 8-Core
Memory	8 GB	16 GB	64 GB
Recommend Storage	1.4 TB RAID 5 (OS and Data)	200 GB RAID 0 or 1 (OS) 6 TB RAID 5 (Data)	200 GB RAID 0 or 1 (OS) 10 TB RAID 5 (Data)

9. Overview of the On-Premise EDGE Server Set-up Process

9.1 On-Premise EDGE Server Set-up Summary

The On-Premise EDGE server setup summary contains the following four (4) steps:

Step 1 - Obtain a physical server or set up a virtual server.

Step 2 - Register to request an EDGE server

Step 3 - Install the EDGE application on the server.

Step 4 - Confirm installation and receive updates.

Issuers can perform steps one (1) through four (4) at any time. Issuers should install and configure an On-Premise EDGE server. Once the issuer has selected a physical or virtual server, issuers should install and configure Red Hat Enterprise Linux Version 6.4. Please note, issuers can install and configure other software requirements by the enterprise. This could include, but is not limited to, antivirus, IDPS/IPS, monitoring agents, backup agents and syslog agents. Issuers should also configure firewall rules. The On-Premise EDGE server will need to be able to communicate via HTTPS or port 443, and will also need to verify access to the AWS public site via the internet.

Issuers can run CMS-provided server-hardening scripts or harden the server according to their own organization standards. Issuers should note that the EDGE server application has been tested with CMS-provided hardening scripts. The second step for establishing an On-Premise EDGE server is requesting a server from CMS. Issuers will access the EDGE server registration site by logging into HIOS. Only issuers with valid HIOS accounts can access the EDGE server registration site. Issuers will indicate if the server will be self-hosted or TPA-hosted. An attestation will need to be signed to complete the process. A request will be sent to CMS to obtain a script so that issuers may provision their On-Premise server. Issuers will be provided a link and instructions to download and install the EDGE server application. CMS will review and approve the On-Premise EDGE server request.

Once the request has been approved, the issuer will receive a link to download a zip file containing a bootstrap script, to run and install the application. The application includes MySQL database 5.5 and Java 1.7. Running the script is a manual process initiated by the issuer. The issuer will be given a properties file or key, and will run the script with the key or file location as a parameter. Security certificates may be required. The deployment script will check the CMS/AWS S3 bucket for updates.

The CMS S3 bucket is a read-only storage location with the CMS security boundary and includes application updates, including the application, database, reference tables and operating system. Access is restricted to only registered EDGE servers. The application will be downloaded and installed to the On-Premise EDGE server automatically. The bootstrap script will put the application from the S3 bucket and issuers will run a script that will pull and install the application from the S3 bucket. Issuers can edit the property files and set a flag to receive updates automatically. By default, this will be turned off with the exception of application updates. Issuers should confirm successful installation of the On-Premise EDGE server. Issuers will use PuTTY to log onto their EDGE server to confirm the version. After the installation is confirmed, issuers will be able to perform security scans of the On-Premise EDGE server and set up administrator rights and user access to the server.

10. Resources

10.1 Resources

The Department of Health and Human Services, or HHS, maintains several resources with general guidance for any organization working with Marketplaces

Resource	Link/Contact Information
Center for Consumer Information and Insurance Oversight (CCIO)	http://cms.gov/ccio/
Registration for Technical Assistance Portal (REGTAP) <ul style="list-style-type: none">• Registration• Inquiry Tracking and Management System (ITMS)• Resource Library• Frequently Asked Questions (FAQs)	https://www.REGTAP.info/

10.2 Inquiry Tracking and Management System (ITMS)

REGTAP users can submit questions to the Inquiry Tracking Management System or ITMS by selecting 'Submit an Inquiry' on the REGTAP Dashboard. Please enter only one question per submission. For questions related to the EDGE server, issuers should contact their Financial Management Service Representative directly and copy the CMS Help Desk at CMS_FEPS@cms.hhs.gov.

10.3 FAQ Database on REGTAP

REGTAP has a searchable FAQ database which allows users to search FAQs. User can search FAQs by FAQ ID, Keyword or phrase, Program Area, Primary and Secondary Categories and Publish Date. You can access the searchable FAQ by clicking the 'FAQs' button on your REGTAP Dashboard.

11. Conclusion

11.1 Conclusion

Thank you all for participating in this CBT. For information regarding additional webinars and user group sessions, please log onto REGTAP at www.REGTAP.info for registration details and discussion topics. For questions regarding the Distributed Data Collection Program, please contact your Financial Management Service Representative directly and copy the CMS Help Desk at EDGE_server_data@cms.hhs.gov.