PI World 2019 Lab

PI System Quick Start Templates for AWS



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1. Introduction

1.1 Overview of Lab

Many PI System users are interested in considering the cloud as an alternative to an on-premises PI System. OSIsoft is working with cloud providers and our customers to make this process easier.

In this lab, we will work with a simplified version of the templates used to create the Quick Start. These templates will deploy PI System components to a pre-created virtual network. In the full Quick Start, templates will also be included to create the virtual network and backend supporting components such as SQL Server.

We will also introduce various resources that OSIsoft is creating to help customers deploy cloud-based PI Systems.

Tasks we will work through in this lab include:

- 1) Deploying a PI System using the Quick Start templates
- Combining the provided Quick Start templates to create a customized PI System on AWS given existing AWS resources
- 3) Remotely accessing created resources
- 4) Deleting created resources

By the end of the lab, you should be able to utilize the provided OSIsoft Quick Start templates in their default form, use them in conjunction with your already existing AWS resources, and understand the concepts of automated deployments on AWS well enough to work with your company's internal AWS experts as well as any Amazon representatives.

2. Your lab system



2.1 Existing architecture

The architecture above has been created before the lab using one of the templates offered by OSIsoft called QSCoreStack.template. It first deploys an Amazon Virtual Private Cloud (VPC) which is a logically isolated section of the Amazon Web Services (AWS) cloud. Within the VPC, it creates a public subnet for internet-facing resources and a private subnet for back-end resources. Resources in the private subnet are not addressable from the Internet but can establish connections to the Internet via the public subnet using Network Address Translation (NAT). Hence, an Internet gateway and a NAT gateway were created to connect your VPC to the Internet and provide internet access to back-end resources respectively.

In the private subnet, a domain controller and a SQL server were created while in the public subnet, a remote desktop gateway was created in order to protect and access all resources within your VPC. Resources in the public subnet were assigned a static IP address, known as an Elastic IP address which is a public IPv4 address that is reachable from the Internet.

2.2 How to login

- 1. Lab Virtual Machine
- a) Open Remote Desktop on your PC
 - i. Press the 'Start' button
 - ii. Type "Remote Desktop Connection"
 - iii. Press Enter
- b) Enter the connection string you were provided and click OK
- c) Log in with the following credentials:

Username: PISCHOOL\student01

Password: Instructor will provide

- 2. AWS console
- a) On your virtual machine, open the AWS Management Console Chrome desktop shortcut. This shortcut links to <u>https://aws.amazon.com/console</u>



b) Click "Already have an account? Sign in"

AWS Management Console

Everything you need to access and manage the AWS cloud — in one web interface.

Create a Free Account

Already have an account? Sign in

c) Log in with the following credentials:

Account ID or alias: Instructor will provide

IAM user name: awsuserxx

Password: piworldsf2019!

d) Ensure that you are in US West (N. California) region as the pre-created virtual network was created in that region.

♤ awsuser29 @ 1991-8366-2446 👻 Support 👻 US East (N. Virginia) US East (Ohio) US West (N. California) US West (Oregon) Asia Pacific (Mumbai) sources on the go Asia Pacific (Seoul) Asia Pacific (Singapore) :ess the Management Consc nsole Mobile App. Learn mo Asia Pacific (Sydney) Asia Pacific (Tokyo) Canada (Central) **WS** EU (Frankfurt) EU (Ireland) rless Containers with AW EU (London) e runs and scales your conta EU (Paris) vers or clusters. Learn more EU (Stockholm) South America (São Paulo) edshift

3. Directed Activity – Deploy a PI Instance using Quick Start templates



3.1 Objective of Activity

This section introduces how to use our Quick Start template to deploy a simplified PI system. The Quick Start template will create a single EC2 instance in the private subnet and install the PI Data Archive, PI AF Server, and PI Analytics with our Field Service technical standards.

3.2 Tasks

- Create S3 buckets for Quick Starts templates and install kits
- Deploy PI stack using OSIsoft's Cloud Formation templates
- Access and validate newly created instances

3.3 Create two S3 buckets

1. The Quick Start files and PI System install kits have already been downloaded on your desktop.

2. On the AWS console, click on Services



4. Click on Create bucket

aws	Services ~	Resource Groups 🗸 🔺
Amazon S3		Stream Video to AWS for Analytics—Easily capture, process, and store video streams for analytics and machine learning. Learn More »
Buckets	•	S3 buckets
Public access		Q Search for buckets
settings for this account		+ Create bucket Edit public access settings Empty Delete

5. Create the first bucket for OSIsoft AWS Quick Starts templates. Bucket names are unique so in the Bucket name field, enter

s3-piworldsf2019-awsuserxx-osiquickstart

where awsuserxx will be replaced by your username

6. Select US West (N. California) for region

	Create bucket					
1 Name and region	2 Configure options	3 Set permissions				
Name and region						
Bucket name 🕚						
s3-piworldsf2019-awsuser30-osiqu	ickstart					
Region						
US West (N. California)			× .			
S Copy settings from an existing b	ucket					
Select bucket (optional)4 Buckets			×			
Create			Cancel Next			
Click Create and you	ur bucket should no	w appear				

- 8. Select the bucket you just created
- 9. Click Upload

7.

Overview	Properties	Permissions	Management	
1 Upload + Create folder	Actions ~			

- 10. Open File Explorer, navigate to Desktop
- 11. Click and drag the "Quickstart" folder which includes the subfolders modules, scripts, and templates over to the Upload window. It will then list the "Quickstart" folder with 112 objects
- 12. Click Upload. The status bar at the bottom will show if the upload is successful. If there are no errors, move on to the next step. Otherwise, click on the error which will show the progress bar then click on Upload

🔔 Upload	72.06% Successful			
Operations	0 In progress	1 Success	1 Error	

Expand "OptionsRequestsDenied" to see which files failed to upload then re-upload those files again in its correct location. If it still fails, try another web browser.

aws Services 🗸 Resource Groups 🗸 🛠		۵	stan1@osisoft.com @ 3976-39 👻 Global 👻 Support 👻
Amazon 53 > s3-piworldsf2019-student01-osiquickstart Overview Properties	Upload Completed	×	
Q Type a prefix and press Enter to search. Press ESC to clear	Source Location: s3-piworldsf2019-student01-o	î	
Upload Create folder Download Actions	🛕 Total files	136	US West (N. California)
Name 👻	Successful	98 (72.06%)	Storage class -
	OptionsRequestDenied	38 (27.94%)	Viewing 1 to 1
	Quickstart.cfproj /s3-piworldsf2019-student01-osiquickstart/	0	
	AWSQuickStart zip /s3-piworldsf2019-student01-osiquickstart/	0	
	ActiveDirectorySPN_11zip /s3-piworldsf2019-student01-osiquickstart/	0	
	CChoco_2.3.1.zip /s3-piworldsf2019-student01-osiquickstart/	0	
	CNIfSAccessControl_1.3.1.zip	<u> </u>	
		Close	
1 Upload 72.06% Successful			27.94% Failed ×
Operations 0 In progress 1 Success			

13. Return to S3 by clicking on "Amazon S3" to create a second bucket for PI System install kits



- 14. Click on Create bucket
- 15. Create the second bucket for PI System install kits. Bucket names are unique so in the bucket name field, enter

s3-piworldsf2019-awsuserxx-osipisetupkits

where *awsuserxx* will be replaced by your username

16. Select US West (N. California) for region

	Create	bucket		×
1 Name and region	2 Configure options	3 Set permissions		
Name and region				
Bucket name 🕚				
s3-piworldsf2019-awsuser30-osip	setupkits			
Region				
US West (N. California)			~	
Copy settings from an existing I	pucket			
Select bucket (optional)4 Buckets			~	
Create			Cancel	ext

- 17. Click Create
- 18. Select the bucket you just created
- 19. Click Upload
- 20. Before we upload the files, we will need to create the file structure used by the templates for the install kits. On your desktop, create a folder called "2018"
- 21. In the "2018" folder you just created, create two folders called "PIServer" and "PIVision"
- 22. Move the "PI-Server_2018_.exe" and "pilicense.dat" file on your desktop to the "PIServer" folder
- 23. Move the "PI-Vision_2017-R2-SP1_.exe" file on your desktop to the "PIVision" folder. You should now have a file structure as follows:



- 24. Click and drag the "2018" folder you just created over to the Upload window of the S3 bucket. It will then list the "2018" folder with 3 objects.
- 25. Click Upload. It will take approximately 5 minutes to finish uploading. If there are no errors, move on to the next step. Otherwise, click on the error which will show the progress bar then click on Upload

🔔 Upload	72.06% Successful			
Operations	0 In progress	1 Success	1 Error	

Expand "OptionsRequestsDenied" to see which files failed to upload then re-upload those files again in its correct location.

26. To prepare ourselves for the next section which uses the bucket names, return back to S3 and copy the names of the two buckets you created to a notepad. Click on the check box next to the s3-piworldsf2019-awsuserxx-osipisetupkits bucket then copy the name on the right to a notepad. Repeat for the second bucket, s3-piworldsf2019-awsuserxx-osiquickstart.

S3 buckets	s3-piworldsf2019-awsuser29-osi X		
Q Search for buckets	Copy Bucket ARN		
Create bucket Edit public access settings Empty Delet Bucket name	Properties Events 0 Active notifications Versioning Disabled MFA delete Disabled		
Cf-templates-26hh7193kkpf-us-west-1	Logging Disabled Static web hosting Disabled Tags 0 Tags		
S s3-piworldsf2019-awsuser29-osipisetupkits	Requester pays Disabled Object lock Disabled		
□ 🗟 s3-piworldsf2019-awsuser29-osiquickstart	Transfer acceleration Disabled		

3.4 Deploy Cloud Formation stack

- 1. Click on Services
- Click on CloudFormation under Management & Governance. CloudFormation is a tool that lets you model and provision all of your cloud infrastructure resources including your PI System infrastructure.

aws	Services 🔺	Res	source Groups 👻 🔸		
History		Fin	id a service by name or featu	re (for example, E	C2, S3 or VM, storage).
S3	•				
CloudFormation		O	Compute	000	Blockchain
Console Home		·	EC2		Amazon Managed Blockchain
EC2			Lightsail 🗗		
Key Managemen	t		ECR		Satallita
Service			ECS	Ŷ	Ground Station
VPC			EKS		Ground Station
			Batch	-	
			Elastic Beanstalk	Ē	Management & Governance
					CloudWatch
					AWS Auto Scaling
		P	Storage		CloudFormation
			S3		CloudTrail
			EFS		Config
Click on "Create Stack"	9				

< → C ■ Sec	ure https://us-west-1.cons	ole-aws.amazon.com/cloudformati	on/?
aws	Services - Res	ource Groups 👻 🕇	
CloudF	formation 🛩 Stac	ks	
Create Stack	- Actions -	Design template	
Filter: Active	Bý Stack Namir		
Stack N	ame	Created Time	

- 4. Use the "Upload a template to Amazon S3" option, click on "Choose File" and select the "ec2PrivatePISystem_PIWorld.template" file from the Desktop\Quickstart\templates folder
- 5. Click Next. If you run into an error like below, simply click Next again.



6. Complete the following parameters:

Parameter	Value	Notes						
Stack name	PIWorldSF19-PI-awsuserxx	awsuserxx is your						
		username						
Global Configuration								
Key Pair Name	PIWorldSF19Lab	This is used to decrypt the password of the instance's administrator						
Prefix used when	piuser <i>xx</i>	<i>xx</i> is your username						
naming resources,		number						
inputs, and outputs								
Network								
ID of the VPC	vpc- <id> (10.0.0/16) (piuser<i>xx</i>-VPC)</id>	<i>xx</i> is your username number						
BackendSubnet0ID	subnet- <id> (10.0.1.0/24) (piuserxx-</id>	xx is your username						
	BackEndSubnet0)	number						
Security Groups								
DomainMember	piuserxx-DomainMemberSG (<sg id="">)</sg>	<i>xx</i> is your username						
SGID	(piuserxx-DomainMembersSecurityGroup)	number						
PISystems SGID	piuserxx-PISystemsSG (<sg id="">)</sg>	<i>xx</i> is your username						
	(piuserxx-PISystemsSecurityGroup)	number						
SQLClientSGID	piuserxx-SQLClientSG (<sg id="">)</sg>	<i>xx</i> is your username						
	(piuserxx-SQLClientSecurityGroup)	number						
AWS Quick Start Co	onfiguration							
Quick Start S3	s3-piworldsf2019-awsuserxx-osiquickstart	awsuserxx is your						
Bucket Name		username; You can paste						
		the bucket name previously						
		copied into your notepad						
Quick Start S3	Quickstart	This has to match with our						
Root Folder Name		s3 root folder						
Quick Start S3	s3-us-west-1	This has to match with our						
Region Name		s3 bucket's region						

Setup Kits S3 Bucket Name	s3-piworldsf2019-awsuserxx-osipisetupkits	<i>awsuserxx</i> is your username; You can paste the bucket name previously copied into your notepad
Setup Kits S3 Root Folder Name	2018	This has to match with our s3 root folder

Leave everything else as default.

- 7. Click Next
- 8. Expand Advanced and select "No" for Rollback on failure". This allows us to troubleshoot the deployment if it fails.

You can set additional options	for your stack, like notification options and a stack policy. Learn more
Notification options	
	No notification
	New Amazon SNS topic
	Торіс
	Email
	Existing Amazon SNS topic
	Ŧ
	Existing topic ARN
Termination Distantion	Eachlad
Termination Protection 0	Disabled
Timeout 0	Minutes
Rollback on failure O	◎ Yes
	No

- Before creating a stack, it is important to review the permissions associated with each IAM resource so you do not unintentionally create resources with escalated permissions. Review your settings, and check the "I acknowledge that AWS CloudFormation might create IAM resources".
- 10. Click on Create. You should then see your stack with a CREATE_IN_PROGRESS status.
- 11. Select the stack you just created and select Events tab to view its progress. The PI stack should complete in 35-40 minutes.

Ove	erview	Output	trputs Resources Events Template Parameters Tags Stack Policy		Stack Policy	Change Sets	Rollback Trig	gers					
Filte	er by:	Status 🕶		rch events									
2010	01.02			Statua		Turk				LogicaLID		Status Desson	
2013-	1-EQ-12		, ·	CDEATE CON		1ype	···EC2··Volum	o Attachmon		EC20VA0Backu		Status Reason	
1	4.55.12	UTC-0800		CREATE CON		010/0	EC2::Volum	eAttachmen	L F	EC20VA0Dacku			
1	4.55.12	UTC-0800		CREATE CON		010/9	EC2::Volum	oAttachmon	L F	EC20VA0Queue			
1	4:59:11	UTC-0800		CREATE CON	IPLETE	AW/9	::EC2::Volum	eAttachmen	t	EC20VA0Binarie	10 10		
1	4:58:56	UTC-0800	'n	CREATE IN P	ROGRESS	AWS	EC2::Volum	eAttachmen	t	EC20VA0Backu		Resource creation Initia	ated
1	4:58:56	UTC-0800	n i	CREATE IN P	ROGRESS	AWS	EC2::Volum	eAttachmen	t	EC20VA0Queue	s.	Resource creation Initia	ated
1	4:58:56	UTC-0800	n (CREATE IN P	ROGRESS	AWS	EC2::Volum	eAttachmen	t.	EC20VA0Archiv		Resource creation Initia	ated
1	4.58.55	UTC-0800	0	CREATE IN P	ROGRESS	AWS		eAttachmen	- -	EC20VA0Binarie	s	Resource creation Initia	ated
1	4:58:41	UTC-0800	0	CREATE IN P	ROGRESS	AWS	EC2. Volum	eAttachmen	-	EC20VA0Backu	05		
× 1	4:58:41	UTC-0800		CREATE IN P	ROGRESS	AWS	EC2: Volum	eAttachmen	t	EC20VA0Archiv	25		
1	4:58:40	UTC-0800) (CREATE IN P	ROGRESS	AWS	EC2::Volum	eAttachmen	t	EC20VA0Queue	s		
× 1	4:58:40	UTC-0800) (CREATE IN P	ROGRESS	AWS	EC2::Volum	eAttachmen	t	EC20VA0Binarie	s		
× 1	4:58:37	UTC-0800) (CREATE CON	IPLETE	AWS	EC2::Volum	е		EC20VolumeDat	a0Archives		
× 1	4:58:37	UTC-0800) (CREATE CON	IPLETE	AWS	EC2::Volum	е		EC20VolumeDat	a0Queues		
► 1	4:58:37	UTC-0800) (CREATE CON	IPLETE	AWS	EC2::Volum	е		EC20VolumeDat	a0Backups		
▶ 1	4:58:36	UTC-0800) (CREATE CON	IPLETE	AWS	EC2::Volum	е		EC20VolumeDat	a0Binaries		
▶ 1	4:58:20	UTC-0800) (CREATE IN P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Queues	Resource creation Initia	ated
▶ 1	4:58:20	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Archives	Resource creation Initia	ated
▶ 1	4:58:20	UTC-0800) (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	ta0Backups	Resource creation Initia	ated
▶ 1	4:58:20	UTC-0800) (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Binaries	Resource creation Initia	ated
▶ 1	4:58:20	UTC-0800) (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Archives		
▶ 1	4:58:20	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Backups		
▶ 1	4:58:20	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Queues		
▶ 1	4:58:20	UTC-0800) (CREATE_IN_P	ROGRESS	AWS	EC2::Volum	е		EC20VolumeDat	a0Binaries		
▶ 1	4:58:19	UTC-0800) (CREATE_IN_P	ROGRESS	AWS	CloudForma	ation::WaitCo	ondition	PISystem0Wait0	Condition	Resource creation Initia	ated
▶ 1	4:58:19	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	CloudForma	ation::WaitCo	ondition	PISystem0Wait0	Condition		
▶ 1	4:58:15	UTC-0800	0 (CREATE_CON	IPLETE	AWS	EC2::Instan	се		EC20			
▶ 1	4:57:42	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	EC2::Instan	се		EC20		Resource creation Initia	ated
▶ 1	4:57:41	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	::EC2::Instan	се		EC20			
▶ 1	4:57:36	UTC-0800) (CREATE_CON	IPLETE	AWS	S::IAM::Instan	ceProfile		EC2RoleInstanc	eProfile		
▶ 1	4:55:36	UTC-0800) (CREATE_IN_P	ROGRESS	AWS	S::IAM::Instan	ceProfile		EC2RoleInstanc	eProfile	Resource creation Initia	ated
▶ 1	4:55:35	UTC-0800	0 (CREATE_IN_P	ROGRESS	AWS	::IAM::Instan	ceProfile		EC2RoleInstanc	eProfile		

If the stack doesn't complete after 40minutes, we can suspect an error. We can also actively monitor the progress and troubleshoot any error during the deployment by remoting into the machine and view the cfn logs which is performed in the next 2 sections.

3.5 Access newly created instances

- 1. After ~10 minutes of stack creation, we can check if the PISystem0 instance has joined the domain. Click on Services
- 2. Click on EC2 under Compute



3. Click on "4 Running Instances"



- 4. We need to first connect to the Remote Desktop Gateway in order to connect to PISystem0. Select the instance "piuserxx-RDGW0"
- 5. Click Connect
- 6. Click Download Remote Desktop File
- 7. Open the Remote Desktop Connection File
- 8. Click Connect
- 9. Select "More choices" then "Use a different account" and log in with the following credentials:

Username: osiquickstart\piadmin

Password: piworldsf2019!

- 10. On the Remote Desktop Gateway node, we can then connect to PI System0:
 - a. Open Remote Desktop Connection on the Remote Desktop Gateway node
 - b. Enter PISystem0.

If the hostname, PISystem0 does not work, you can use its IP. The IP can be obtained as follows:

- a. Return back to the AWS console to the list of EC2 instances from steps 1-3
- b. Select "piuserxx-PISystem0" and the IP appears on the bottom under "Description" next to "Private IPs"
- 11. Log in with the following credentials:

Username: osiquickstart\piadmin

Password: piworldsf2019!

If those credentials fail, the instance may be rebooting. Try again in a few minutes. If it still continues to fail, it may have failed to join the domain so log in with the following credentials:

Username: PISystem0\administrator

Password: Instructor will provide

3.6 Validate newly created instances

During the stack creation, you might see pop ups on formatting disks and the instance may restart. This is a positive sign that the deployment is still in progress. If the instance does restart, simply remote back in to "PISystem0" for the next step.

- 1. To monitor the progress of the stack creation, we can look at the cfn logs to ensure there are no errors with the deployment. On PISystem0,
 - a. Open File Explorer
 - b. Navigate to C:\cfn\log
 - c. Open cfn-init.txt

This file logs the deployment progress and can help you troubleshoot any failures. If you see any errors, ask a lab assistant to help troubleshoot. Otherwise, wait till the stack is completed then proceed to the next step. The stack is complete when the status of the PI stack on the AWS Console changes from "CREATE_IN_PROGRESS" TO "CREATE_COMPLETE"

С	reate Stack		Actions -	Design to	emplate							
Fi	Iter: Active	e - By :	Stack Name									
	Stack N	lame						Created Time		Status		Dri
•	PIWorld	SF19-PI-	awsuser28					2019-03-18 14:54:	39 UTC-0700	CREATE_COM	PLETE	NO
	PIWorld	SF19-Co	re-awsuser28-SQL	Stack-EPF9	BH0UF6XS	NESTER	D	2019-03-18 14:07:	26 UTC-0700	CREATE_COM	PLETE	NO
	PIWorld	SF19-Co	re-awsuser28-RDG	WStack-1FI	M68XCX38CF	R NESTED	D	2019-03-18 14:07:	25 UTC-0700	CREATE_COM	PLETE	NO
	PIWorld	SF19-Co	re-awsuser28-ADS	tack-142QF	BCXDZWSE	NESTER	D	2019-03-18 13:42:	34 UTC-0700	CREATE_COM	PLETE	NO
	PIWorld	SF19-Co	re-awsuser28-PISe	curityGroup	Stack-119SOF	3HPD NESTER	D	2019-03-18 13:41:	55 UTC-0700	CREATE_COM	PLETE	NO
	PIWorld	SF19-Co	re-awsuser28-Core	SecurityGro	upStack-1ME	ODK5 NESTER	D	2019-03-18 13:41:	02 UTC-0700	CREATE_COM	PLETE	NO
	PIWorld	SF19-Co	re-awsuser28-VPC	Stack-1GDS	RYVUF0M00	NESTED	D	2019-03-18 13:37:23 UTC-0700 CREAT			PLETE	NO
	PIWorld	SF19-Co	re-awsuser28					2019-03-18 13:37:	15 UTC-0700	CREATE_COM	PLETE	NO
0	verview	Outputs	s Resources	Events	Template	Parameters	Tags	Stack Policy	Change Sets	Rollback Trigge	ers	
Fi	Iter by: Sta	atus 👻	Search events									
201	9-03-18		Status		Тур)e			Logical ID	:	Status Reas	on
•	15:25:56 U	TC-0700	CREATE_COM	IPLETE	AW	/S::CloudFormati	on::Stac	k	PIWorldSF19-F	Pl-awsuser28		
•	15:25:52 UTC-0700 CREATE_COMPLETE AWS::CloudFormation:						on::Wait	Condition	PISystem0Wait	Condition		
•	14:58:42 UTC-0700 CREATE_COMPLETE AWS::EC2::VolumeAttac					Attachme	ent	EC20VA0Binar	ies			

If the stack has not completed after 40 minutes, we can suspect an error. Ask a lab assistant to help troubleshoot.

- 2. Ensure all PI components are installed by opening programs and features to see what has been installed.
 - a. Click Start
 - b. Open Control Panel
 - c. Select Programs
 - d. Select Programs and Features

You will then see a list of PI components installed

Name	Publisher	Installed On	Size	Version
🧊 Amazon SSM Agent	Amazon Web Services	2/13/2019	92.2 MB	2.3.444.0
🞁 AWS PV Drivers	Amazon Web Services	2/13/2019	21.7 MB	8.2.6
🞁 AWS Tools for Windows	Amazon Web Services Develope	2/13/2019	513 MB	3.15.666
📧 aws-cfn-bootstrap	Amazon Web Services	10/14/2018	11.9 MB	1.4.31
Microsoft SQL Server 2012 Native Client	Microsoft Corporation	3/14/2019	9.70 MB	11.0.2100.60
₿Microsoft Visual C++ 2017 Redistributable (x64) - 14.1	Microsoft Corporation	3/14/2019	23.3 MB	14.11.25325.0
Hicrosoft Visual C++ 2017 Redistributable (x86) - 14.1	Microsoft Corporation	3/14/2019	19.7 MB	14.11.25325.0
OSIsoft MS VB Runtime Redistributables	OSIsoft, LLC	3/14/2019	2.87 MB	1.0.1
🔇 PI AF Client 2018	OSIsoft, LLC	3/14/2019	97.4 MB	2.10.0.8628
🔇 PI AF Server 2018	OSIsoft, LLC	3/14/2019	27.1 MB	2.10.0.8628
PI Analysis Service 2018	OSIsoft, LLC	3/14/2019	9.70 MB	2.10.0.8628
🦪 PI Buffer Subsystem	OSIsoft, LLC	3/14/2019	26.4 MB	4.7.0.37
🔧 PI Collective Manager 2018	OSIsoft, LLC	3/14/2019	6.31 MB	1.4.1.11
🦪 PI Data Archive 2018	OSIsoft, LLC	3/14/2019	175 MB	3.4.420.1182
🦪 PI Ramp Soak Simulator (rmp_sk) Interface X64	OSIsoft, LLC	3/14/2019	2.48 MB	3.4.420.1182
🦪 PI Random Simulator (random) Interface X64	OSIsoft, LLC	3/14/2019	3.42 MB	3.4.420.1182
🔇 PI Server 2018 Installer	OSIsoft, LLC	3/14/2019	912 MB	1.0.0.1496
🦪 PI Software Development Kit (PI SDK) x64 2018	OSIsoft, LLC	3/14/2019	76.1 MB	1.4.7.516
🦪 PI Software Development Kit (PI SDK) x86 2018	OSIsoft, LLC	3/14/2019	76.1 MB	1.4.7.516
R System Directory Publisher 2018	OSIsoft, LLC	3/14/2019	28.9 MB	1.1.0.1970
R PI System Directory System Tray 2018	OSIsoft, LLC	3/14/2019	5.25 MB	1.1.0.1970
👯 PI System Management Tools 2018	OSIsoft, LLC	3/14/2019	27.6 MB	3.6.0.13
PowerShell Tools for the PI System	OSIsoft, LLC	3/14/2019	12.8 MB	2.2.0.24

3. Ensure PI Data Archive security follows Field Service Technical Standards

- a. Click Start > PI System > PI System Management Tools
- b. On PI System Management Tools, click on the checkbox next to the PI Data Archive, PISystem0, to connect
- c. Once the checkbox is checked, expand Security and explore
 - i. Database Security
 - ii. Identities, Users, & Groups
 - iii. Mappings & Trust

These match with our PI Server (PI Data Archive) Install FS Technical Standard

Table Na	ame	Server	Collective	Security
🖀 PIAF	INK	PISYSTEMO		piadmin: A(r,w) piadmins: A(r,w) PIWorld: A()
🗑 PIAR	CADMIN	PISYSTEM0		piadmins: A(r,w)
🗑 PIAR	CDATA	PISYSTEMO		piadmins: A(r.w)
🗑 PIAU	DIT	PISYSTEM0		piadmins: A(r,w)
🗑 PIBA	CKUP	PISYSTEM0		piadmins: A(r,w)
🗑 PIBat	ch	PISYSTEM0		piadmins: A(r,w) P Users: A(r) P World: A(r)
🗑 PIBA	TCHLEGACY	PISYSTEM0		piadmin: A(r,w) piadmins: A(r,w) PIWorld: A(r)
🗑 PICa	mpaign	PISYSTEM0		piadmins: A(r,w) PI Users: A(r) PIWorld: A(r)
🗐 PIDB	SEC	PISYSTEM0		piadmins: A(r,w) P Users: A(r) P Web Apps: A(r) PI Data Collection Managers: A(r) P World: A(r)
🗑 PIDS		PISYSTEM0		piadmins: A(r,w) P Users: A(r) P Points&Analysis Creator: A(r,w) P Connector Relays: A(r,w) P Data Collection Managers: A(r) P World: A(r)
🗑 PIHe	adingSets	PISYSTEM0		piadmins: A(r,w) PI Users: A(r) PIWorld: A(r)
🗑 PIMA	PPING	PISYSTEM0		piadmins: A(r,w) PI Web Apps: A(r)
🗑 PIMo	dules	PISYSTEM0		piadmins: A(r,w) PI Users: A(r) PIWorld: A(r)
🗑 PIMS	GSS	PISYSTEM0		piadmins: A(r,w) PI Users: A(r,w) PIWorld: A(r,w)
🗐 PIPO	INT	PISYSTEM0		piadmins: A(r,w) Pl Buffers: A(r,w) Pl Interfaces: A(r) Pl Users: A(r) Pl Points&Analysis Creator: A(r,w) Pl Web Apps: A(r) Pl Connector Relays: A(r,w) Pl Data Collection Managers: A(r) Pl World: A(r)
🗑 PIRe	plication	PISYSTEM0		piadmins: A(r,w) PI Data Collection Managers: A(r)
🕤 PITra	nsferRecords	PISYSTEMO		piadmins: A(r,w) PI Users: A(r) PIWorld: A(r)
🗑 PITR	UST	PISYSTEM0		piadmins: A(r,w)
🗐 ΡΙΤυ	NING	PISYSTEMO		piadmins: A(r,w)
🕤 PIUS	ER	PISYSTEM0		piadmins: A(r,w) PI Users: A(r) PI Web Apps: A(r) PI Connector Relays: A(r) PI Data Collection Managers: A(r) PIWorld: A(r)

PI Identities PI Users PI Group	os									
Identity	Server									
PI Buffers	PISYSTEM0									
PI Connector Relays	PISYSTEM0									
🔋 🔋 PI Data Collection Managers	PISYSTEM0									
8 PI Interfaces	PISYSTEM0						PI Identities	PI Users	PIG	iroups
🔋 PI Points&Analysis Creator	PISYSTEMO	PI Identities	PI Users	PIC	Groups	Г	r r loonadoo	1100010		
😤 PI Users	PISYSTEM0		•				Group	Server		Users
🙎 PI Web Apps	PISYSTEM0	Usemame	Server		Groups		🚨 piadmins	PISYSTE	EMO	piadmin
PIWorld	PISYSTEMO	🛃 piadmin	PISYSTE	MO	piadmins		🔛 piusers	PISYSTE	EMO	

Mappings Trusts							
Mapping	Server	Collective	Description	PI Identity	Enabled		
BUILTIN\Administrators	PISYSTEMO			piadmins	True		
OSIQUICKSTART\Domain Users	PISYSTEM0			PI Users	True		
OSIQUICKSTART\PIAdmins	PISYSTEM0			piadmins	True		
OSIQUICKSTART\PIBuffers	PISYSTEM0			PI Buffers	True		
OSIQUICKSTART\PIConnectorRelays	PISYSTEM0			PI Connector Relays	True		
OSIQUICKSTART\PIDataCollectionManagers	PISYSTEM0			PI Data Collection Managers	True		
OSIQUICKSTART\PIInterfaces	PISYSTEM0			PI Interfaces	True		
OSIQUICKSTART\PIPointsAnalysisCreator	PISYSTEM0			PI Points&Analysis Creator	True		
OSIQUICKSTART\PIWebApps	PISYSTEM0			PI Web Apps	True		

4. Ensure PI Data Archive install directory follows Field Service Technical Standards. Open File Explorer and navigate between F, G, H, and I drives. The folder structure follows our PI Server (PI Data Archive) Install FS Technical Standard



- 5. Ensure PI Server Backup task is created
 - a. Click Start
 - b. Enter task scheduler
 - c. On task scheduler, select Task Scheduler Library and you will see PI Server Backup.

Task Scheduler (Local)	▲ Name	S	Triggers
	Pl Server Backup	Ready	At 3:15 AM every day
	() Amazon Ec2 Launc	Disabled	At system startup

6. Ensure PI AF is working

- Click Start > PI System > PI System Explorer. You should see DemoDB database which contains one element called "Demo-PI-Points".
- b. Select the element "Demo-PI-Points"
- c. Click on the Attributes tab. You should see a list of attributes with good values.

\\PISYSTEM0\DemoDB - PI System Explorer (Administrator)

😕 Database 🛭 🔠 Query D	Date + 🕔	Back	0	Check In	1
lements	Demo-Pl-	Points			
Elements Demo-PI-Points Element Searches	General	Child Elements A	Attribute	s Ports	Anal
		R Name	۵	Value	
	ø .	🍼 BA:ACTIV	E.1	Active	
	ø 🗉	Ø BA:CONC	.1	17.953 ℃	
	ø 🗉	Ø BA:LEVEL	.1	23.572	
	ø 🗉	🎺 BA:PHASE	.1	Phase3	
	ø 🗉	🎺 BA:ТЕМР.	1	19.904 °C	
	ø 🗉	CDEP 158		2	
	ø 🗉	CDM158		Auto	
	ø 🗉	CDT158		52.081 °C	
	ø 🗉			0.51112	
	J 🗉	SINUSOID	U	0.51112	

4. Directed Activity – Customize Quick Start deployment



4.1 Objective of Activity

This section introduces how to use templates for a specific architecture. PI Vision is missing in our existing architecture so this activity shows how to just deploy PI Vision into our existing architecture.

4.2 Identify the Tasks

- Deploy PI Vision stack using OSIsoft's Cloud Formation templates
- Access PI Vision website
- Create PI Vision display

4.3 Deploy PI Vision stack

1. Return back to the lab virtual machine and the AWS console

- 2. Click on Services
- 3. Click on CloudFormation under Management & Governance
- 4. Click on "Create Stack"



5. Use the "Upload a template to Amazon S3" option, click on "Choose File" and select the "ec2PublicPIVision.template" file from the Desktop\Quickstart\templates folder. This template was not customized for this lab and is part of our Quick Start package.

Select Template		Open		×			
Select the template that descri	bes the stack that you want to create. A st	$\leftarrow \rightarrow \ \checkmark \ \uparrow$ Quickstart \rightarrow templates $\checkmark \ \circlearrowright$ Search templates					
		Organize 🔻 New fo	older 🔠 🔻				
Design a template	Use AWS CloudFormation Designer to c Design template	> 📌 Quick access	Name Date modified Date modified 12/7/2018 1:39 F				
Choose a template	A tomplato is a ISON/VAML formatted to	> 🐔 OneDrive	c2PrivatePIAF.template 12/7/2018 1:39 F c2PrivatePIAnalysis.template 12/7/2018 1:39 F				
Choose a template	Select a sample template	> 🔊 Pll4Azure Launci	ec2PrivatePIDA.template 12/7/2018 1:39 F ec2PrivatePISystem_PIWorld.template 12/20/2018 4:04				
	Upload a template to Amazon S3	 This PC Desktop 	ec2PrivateSQL.template 12/7/2018 1:39 F ec2PublicPlIntegrator.template 12/7/2018 1:39 F	No preview available.			
	Choose File No file chosen	> 🔮 Documents > 🕂 Downloads	c2PublicPlSystem.template 12/7/2018 1:39 F c2PublicPlVision.template 12/7/2018 1:39 F 12/7/2018 1:39 F 12/7/2018 1:39 F 12/7/2018 1:39 F				
	Specily an Amazon 55 template ORL	> 🍌 Music > 📰 Pictures	c2PublicPriston=Vitemplate 12/7/2018 1:39 F OSCoreStack.template 12/7/2018 1:39 F 12/7/2018 1:39 F				
		> 📕 Videos > 🎬 Local Disk (C:)	QSMasterStack.template 12/7/2018 1:39 F				
		Fil	le name: ec2PublicPlVision.template v All Files	~			
			Open 🔶 C	ancel			

- 6. Click Next
- 7. Complete the following parameters:

Parameter	Value	Notes
Stack name	PIWorldSF19-Vision-awsuserxx	awsuserxx is your
		username
Global Configuration	on	
Deploy HA	false	
Prefix used when	piuser <i>xx</i>	xx is your username number
naming resources,		
inputs, and outputs		
Key Pair Name	PIWorldSF19Lab	This is used to decrypt the password of the instance's
		administrator
PI Vision Parameter	rs	· · ·
PI Vision Service	svc-pivs0	
Account Name		

PI System Parameters				
NetBIOS name of	PISystem0			
the PI Data Archive				
server				
NetBIOS name of	PISystem0			
the PI AF server				
Network Configuration				
ID of the VPC	vpc- <id> (10.0.0.0/16) (piuser<i>xx</i>-VPC)</id>	xx is your username number		
FrontendSubnet0ID	subnet- <id> (10.0.0.0/24) (piuser<i>xx</i>- FrontEndSubnet0)</id>	<i>xx</i> is your username number		
FrontendSubnet1ID	subnet- <id> (10.0.0/24) (piuser<i>xx</i>-</id>	<i>xx</i> is your username		
	FrontEndSubnet0)	number.		
		This field cannot be left		
		blank		
Security Groups				
Domain Member	piuserxx-DomainMemberSG (<sg id="">)</sg>	<i>xx</i> is your username number		
SGID	(piuserxx-			
	DomainMembersSecurityGroup)			
PI Systems SGID	piuserxx-PISystemsSG (<sg id="">)</sg>	xx is your username number		
	(piuserxx-PISystemsSecurityGroup)			
SQL ClientSGID	piuserxx-SQLClientSG (<sg id="">)</sg>	xx is your username number		
	(piuserxx-SQLClientsSecurityGroup)			
AWS Quick Start Configuration				
Quick Start S3	s3-piworldsf2019-awsuserxx-osiquickstart	<i>awsuserxx</i> is your		
Bucket Name		username; You can paste		
		the bucket name previously		
		copied into your notepad		
Quick Start S3	Quickstart	This has to match with our		
Root Folder Name		s3 root folder		
Quick Start S3	s3-us-west-1	This has to match with our		
Region Name		s3 bucket's region		
Setup Kits S3	s3-piworldsf2019-awsuserxx-	<i>awsuserxx</i> is your		
Bucket Name	osipisetupkits	username; You can paste		
		the bucket name previously		
		copied into your notepad		
Setup Kits S3 Root	2018	This has to match with our		
Folder Name		s3 root folder		

Leave everything else as default.

You will notice some parameters that do not apply:

- PI Vision 1 NetBIOS Name
- PI Vision Load Balanced Name
- PI Vision Elastic Load Balancer Name
- Frontend Subnet1 ID

These parameters will be ignored if DeployHA is set to false. Similarly, if there isn't a second SQL node, "NetBIOS name of the secondary SQL Node" will be ignored. However, these parameters cannot be left blank.

- 8. Click Next
- 9. Expand Advanced and select "No" for Rollback on failure". This allows us to troubleshoot

the deployment if it fails.

No notification New Amazon SNS topic Topic Email
No notification New Amazon SNS topic Topic Email
New Amazon SNS topic Topic Email
Topic Email
Email
 Existing Amazon SNS topic
Ψ.
Existing topic ARN
EnabledDisabled
Minutes
<mark>⊚ Yes</mark>

- 10. Before creating a stack, it is important to review the permissions associated with each IAM resource so you do not unintentionally create resources with escalated permissions. Review your settings, and check the "I acknowledge that AWS CloudFormation might create IAM resources".
- 11. Click on Create. You should then see your stack with a CREATE_IN_PROGRESS status.
- 12. Select the stack you just created and select Events tab to view its progress. The stack should complete in 30-35 minutes.
- 13. Once the stack is complete, return to your remote desktop gateway machine and open Chrome browser.
- 14. Navigate to https://pivs0/pivision
- 15. You will be brought to the page below as we have a self-signed certificate for PI Vision. Click Advanced



Your connection is not private

Attackers might be trying to steal your information from **pivs0** (for example, passwords, messages, or credit cards). <u>Learn more</u>

NET::ERR_CERT_AUTHORITY_INVALID

Help improve Safe Browsing by sending some <u>system information and page content</u> to Google.
<u>Privacy policy</u>





16. Click on "Proceed to pivs0 (unsafe)

This server could not prove that it is **pivs0**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

Proceed to pivs0 (unsafe)

- 17. Login with your credentials:
 - Username: osiquickstart\piadmin Password: piworldsf2019!
- 18. Select "New Display"
- 19. Click on the arrow next to DemoDB

PI Vision					
Θ	Assets				
埢		₽			
	Search in PI System	٩			
	🗹 🛢 DemoDB	>			
	🖉 🧐 PI	>			

- 20. Click on Demo-PI-Points which will list all its attributes. If you do not see Demo-PIPoints element, wait about 3 minutes after the PI Vision stack has completed for PI Web API to complete crawling. Refresh the page again to see Demo-PI-Points.
- 21. Click and drag any attribute such as cdt158 to the right



22. If you can see a trend with values, PI Vision was successfully created.

5. Directed Activity – Complete OSIsoft AWS Quick Start lifecycle

5.1 Objective of Activity

This section demonstrates how to optionally delete the stacks and buckets.

5.2 Identify the Tasks

• Delete stacks, and S3 buckets

5.3 Delete stacks

- 1. Return back to the lab virtual machine and the AWS console
- 2. Click on Services
- 3. Click on CloudFormation under Management & Governance
- 4. Select your stack "PIWorldSF19-Vision-awsuserxx" where awsuserxx is your username
- 5. Click Actions
- 6. Click Delete Stack
- 7. Click "Yes, Delete" to delete the stack
- 8. Select your stack "PIWorldSF19-PI-awsuserxx" where awsuserxx is your username
- 9. Click Actions
- 10. Click Delete Stack
- 11. Click "Yes, Delete" to delete the stack
- 12. There are 6 other stacks associated with your environment. The stack "PIWorldSF19-Core-*awsuserxx*" had created the other 6 stacks:
 - PIWorldSF19-Core-awsuserxx-VPCStack-<id>
 - PIWorldSF19-Core-awsuserxx-CoreSecurityGroupStack-<id>
 - PIWorldSF19-Core-awsuserxx-PISecurityGroupStack-<id>
 - PIWorldSF19-Core-awsuserxx-ADStack-<id>
 - PIWorldSF19-Core-awsuserxx-SQLStack-<id>
 - PIWorldSF19-Core-awsuserxx-RDGWStack-<id>

To delete all the stacks, select stack "PIWorldSF19-Core-*awsuserxx*", and click Actions 3. Click Delete Stack

- 13. Click Delete Stack
- 14. Click "Yes, Delete" to delete all the remaining stacks

5.4 Delete S3 buckets

- 1. Click on Services
- 2. Click on S3 under Storage
- 3. S3 buckets can only be deleted one at a time. Click on the checkbox next to one of your buckets and select "Delete"
- 4. Type the name of the bucket
- 5. Click Confirm to delete the bucket
- 6. Repeat steps 4-6 for the other bucket.

Appendix 1 - Glossary

Availability Zone:

A collection of data centers within a region, physically isolated and connected by fast low-latency networks.

Elastic Compute Cloud (EC2):

Dedicated virtual servers with remote access (virtual machines).

Elastic/Application Load Balancer (ELB/ALB):

Automatically distributes incoming application traffic across multiple targets.

Identity and Access Management (IAM):

Configure AWS security access for services and resources.

Region:

A geographic area with two or more availability zones. Communication between regions occurs over public internet.

Simple Storage Solution (S3):

Bucket of static files for storage.

Stack:

A collection of AWS resources that you create and delete as a single unit.

Virtual Private Cloud (VPC):

A private virtual network that logically isolates cloud resources from other networks.

PowerShell:

PowerShell is a task-based command-line shell and scripting language built on .NET. PowerShell helps system administrators and power-users rapidly automate tasks that manage operating systems (Linux, macOS, and Windows) and processes.

Desired State Configuration (DSC):

DSC is a management platform in PowerShell that enables you to manage your IT and development infrastructure with configuration as code.

A complete glossary of AWS terms can be found in the AWS documentation here: <u>https://docs.aws.amazon.com/general/latest/gr/glos-chap.html</u>

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