

# TCPWave IP Address Management System<sup>®</sup>

# ServiceNow Integration

Version 11.30P10 August 26, 2020





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#### **TCPWave Integration with ServiceNow**

#### **DDI Automation in ServiceNow**

Enterprises using the TCPWave IPAM 11.30P10 (Athena) can leverage the seamless integration into the ServiceNow workflows. Activities such as Change Request Approval or Reporting an Incident or Planning a corrective plan of action that are performed in ServiceNow can be chained into the TCPWave Script Include Functions to invoke an appropriate API in a secure authenticated manner.

#### ServiceNow versions supported by TCPWave

- Jakarta
- Kingston
- London
- Madrid
- New York
- Orlando

#### **Architecture Overview**



The architectural diagram above illustrates how user actions in ServiceNow can be chained to invoke outbound HTTP Rest Calls to TCPWave IPAM. The ServiceNow instance and TCPWave IPAM communicate using HTTPS (HTTP with SSL) to enforce industry standard security for mission critical operations. Here is an example of a workflow. When a change request to define a new DNS Domain is approved by a privileged user.

• Description of the change request contains the JSON payload.



- Request Moderator, A Script Include JavaScript Function is invoked when the change request is approved.
- The Request Moderator will identify the workflow as an "Add a DNS Domain" action by inspecting the JSON Payload and initiates an outbound REST Call to the TCPWave IPAM to perform the corresponding action.
- Both the ServiceNow Instance and the TCPWave IPAM first perform an SSL Handshake exchanging the certificates in their corresponding key stores to establish a mutual authentication trust.
- Upon authentication, the TCPWave IPAM accepts the "Add a DNS Domain" HTTP Request and performs the desired action.

# **Getting Started**

#### **Authentication Setup**

The example below illustrates the functionality using self-signed SSL certificates. However, TCPWave highly recommends the usage of valid certificates signed by trusted authorities for security reasons.

1. Create a root certificate using the following commands

openssl genrsa -des3 -out snowAppCA.key 4096 openssl req -x509 -new -nodes -key snowAppCA.key -sha256 -days 1024 -out snowAppCA.crt

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		Certificate Storage Password*				
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above figure illustrates importing snowAppCA.crt and snowAppCA.key files as an appliance certificates into TCPWave IPAM. Please ensure that Trust CA is selected in the above screen during the Import.

2. Create the user certificate using the following commands

openssl genrsa -out snowApp.key 2048 openssl req -new -key snowApp.key -out snowApp.csr



3. Sign the user certificate by root CA certificate using the following command

openssl x509 -req -in snowApp.csr -CA snowAppCA.crt -CAkey snowAppCA.key -CAcreateserial -out snowApp.crt -days 500 -sha256

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above figure illustrates importing snowApp.crt as an user certificate into TCPWave IPAM. This step is required to associate all the incoming HTTP Requests using this certificate to a user in the IPAM.

4. Generate the PKCS12 format certificate sing the following command

openssl pkcs12 -export -in snowApp.crt -inkey snowApp.key -name snowWave -out snowWave.pkcs12

5. Import TCPWave SSL Certificate in ServiceNow.

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0 <b>*</b> 🗉	Manage Attachments (1):	snowWave.pics12 [rename][download]			
System Definition	* Name	TCFWave-ServiceNow	Туре	PKCS12 Key Store	~
Certificates	* Notify on expiration	읍 System Administrator	Expires in days		
System LDAP	★ Warn in days to	20	Key store password		
Certificates	expire Active				
	Short description	TCPWave SSL Certificate			
	Update Delete				
	Related Links				
	Validate Stores/Certificates				

The above figure illustrates importing TCPWave SSL Certificate into the ServiceNow Instance. This certificate is in the default pkcs12 Format.

5. Define Mutual Authentication Protocol in ServiceNow

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Protocol		8	Protocol Profile     myhttps			Ø	• ooo Update	Delete	$\uparrow ~ \downarrow$
8	*	0	Defines an association betw	veen a unique protocol and a keystore and defa	ult port. <u>More Info</u>				
System Security Protocol Profiles			* Protocol	myhttps	Keystore	TCPWave-ServiceNow	٩	0	
			Default port	7443					
			Update						



The above figure illustrates defining a unique protocol and a key store to a default port.

#### **Configuring Script Includes in ServiceNow**

Define Script Include Functions to invoke the TCPWave API.

<      Script Include     TCPWave_Domain_Add				∥ √ ∄ …	Update Delete	↑ <b>↓</b>
Name	TCPWave_Domain_Add	Application	Global		0	î
API Name	global.TCPWave_Domain_Add	Accessible fro	m This application scope only	*		- 1
Client callable	<ul> <li>Image: A start of the start of</li></ul>	Acti	re 🗹			- 1
Description						
	<pre>interface Totom_Domach_data(){     try     try</pre>	<pre>clicities(); ett); ett); ett); ett); ett); ett); ett); ett0;</pre>				
Protection policy						
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Script Includes are runnable JavaScript Functions that can be defined in the ServiceNow Web UI. They make use of the native ServiceNow JavaScript API to perform executable actions such as invoking an outbound HTTP REST Call. The above figure illustrates adding Script Include Functions in ServiceNow to perform various RESTful Actions on TCPWave DDI. Note: The TCPWave Git Repo provides example JavaScript code snippets for reference.

#### **Configuring Workflows in ServiceNow**

TCPWave DDI Integration with change events in ServiceNow is achieved using simple workflow transitions that implement JavaScript directives to capture change request information and invoke the appropriate Script Includes. Workflows in ServiceNow can be configured to be invoked on demand based on various ongoing activities in the application such as Approval of a Change Request, Implementation of a Change Request etc. The conditions to invoke a specific workflow are formulated from the business requirements in an enterprise.

workflow automate	s and visualizes a multi-	step process as a sequence of	f activities. <u>More Info</u>				
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	$\ast$ Name	TCPWave_Integration		Checked out	12/10/2018 12:20:04		
	* Table	Change Request [change	request] 🔻	Checked out by	manohar k		
	Published						
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eneral conductors imputs A	annes Application achequite Estim	eed Rumunie		
pecify at least one Condition to trigg	er the workflow. Select one of the following o	ptions to determine what happens when a reco ach time an inserted record matches the condit	rd inserted on the selected table matches the condition:	
un the workflow: Workflow(s) start i un if no other workflows matched y	: The workflow starts when a record matche	the condition, only if no other workflows are r	on. Inning on the record.	
one: The workflow does not start ur	ess it is triggered by a subflow or script.			
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If condition match	s Run the workhow always	•	Order	100
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As illustrated in the figures above, a simple workflow called TCPWave\_Integration has been defined to operate on the Change\_Request Table. This workflow runs on two definitive conditions where the short\_description is *add\_domain* and the state of the Change Request is *approved*.

Welcome	or CPWave_Inte	gration	o∦ TCPWav	e_Integration	1
🔳 ТСРИ	Vave_Integration - C	hecked ou	ıt by me		
Begin       Always	in s	ୁତ୍ର Run Stage: Co Call_Scrip	Script omplete ot_Includes Always	8	End End

A diagrammatic representation of the *TCPWave\_Integration* workflow is demonstrated in the above figure. This workflow is going to invoke a JavaScript that would capture the Change Request Information such as the JSON Payload and the type of integration request such as *add\_domain/add\_static\_object* by looking at the *short\_description* and *description* fields respectively.



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	Name	Cill_Script_Includes		
	Stage	Complete	۹	
Script				$\sim$
The Run Script activit	ty runs the specified	script in the scope of the workflow version. <u>More Info</u>		
	Script	Image: Sector Control Contro Contro Control Control Control Control Control Control Control C	>	
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nditions				
				(1)

The Run Script definition presented in the figure shown above is going to derive the *description* and *short\_description* fields of the current change request item and invoke the corresponding Script Include function.

#### **Defining Change Requests in ServiceNow**



The screenshot above is going to illustrate how a new change request is defined in ServiceNow by attaching *short\_description* and *description* field with the appropriate values required for the TCPWave Integration.

Skip to Main Content al TCF	Wave_Integration	
State: Finished 12/10/2018 12:2	23:47 - 12/10/2018 12:2	3:48
Begin - Finished Begin Always	Run Script - Finished	
	Call_Script_Includes	
	Always	
		End - Finished
		End



Once the authorized administrator approves the Change Request – The workflow kicks in to complete the automation request – the above figure illustrates a successful execution of the workflow.

TCPWave #Dashbo	rd i	🎢 Quid	k Tasł	s 1	SR Noti	vork Manager	nent+	💼 Infra	structur	e Managerr	nent <del>-</del>	🖉 Repo	rts 🕶	🔮 Admir	histration	1.							
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Appliance Groups																							
BULK DATA OPERATIONS		•	0	0	=	99.4.0.1		router-93524	8	aaa.com		Router		twcadm		09.19.37 1	0-15-2018			Static			
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CLOOD IMANAGEMENT			0	Ο		99.4.0.3														Unallocated			
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IIII DNS MANAGEMENT		* I	0	0	Û	99.4.0.6		AWS00001In	stance	aaa.com		AWS Insta	nce	twcadm		10:12:20 1	0-15-2018	twcadm	16:22:28 10-15-2018	Static			1200

Because of a successful workflow execution, the screenshot above shows that the domain *mailservices.enterprise.com* has been added to the TCPWave IPAM.

#### Conclusion

The Webservices offered by TCPWave DDI can be extensively leveraged from applications such as ServiceNow to combine and automate Change Request Management and day to day DDI workflows without compromising security. The SSL Based authentication between ServiceNow and TCPWave IPAM enforces encrypted data exchange thus ensuring a trusted conduit. Enterprises using TCPWave DDI can now seamlessly integrate with ServiceNow and engineer custom workflows with endless possibilities to accomplish 100% safe and secure DDI Workflow Automation.

#### List of workflows supported by TCPWave

- Network
  - Create network Workflow
  - o Delete network Workflow
  - List of Networks Workflow.
- DNS
  - $\circ \quad \text{Create A record Workflow} \\$
  - o Delete A record Workflow
  - Create C record Workflow
  - Delete C record Workflow
- DHCP
  - Create Scope Workflow
  - Delete Scope Workflow
  - Create DHCP Manual Object Workflow
  - o Delete DHCP Manual Object Workflow
- IPAM
  - o Get Next Free Available IP Workflow
  - o Create a Static Object Workflow
  - Delete static Object Workflow
  - Edit Object Workflow
  - Delete Object Workflow
  - Add Object RR Workflow
  - o Edit Object RR Workflow
  - Delete Object RR Workflow
  - Add Zone RR Workflow



- Edit Zone RR Workflow
- Delete Zone RR Workflow

#### **Network Add Payload**

Short description field: - add\_network Description Field: Copy the below JSON payload

{

"address": "20.0.0.0", "mask\_length": "24", "organization\_name": "Internal", "name": "ServiceNow Network", "description": "SNOW", "createRevZone": "yes", "dmzVisible": "no", "dnssec\_enable": "no", "nsec\_option": "NSEC3", "monitoringService": "no", "enable\_discovery": "no", "discovery\_template": "", "percentageFull": 100, "email\_check": 1, "snmp\_check": 0, "log check": 0, "zoneTemplateId": "", "zoneTemplateName": null, "addr1": "20", "addr2": "0", "addr3": "0", "addr4": "0", "extensions": []



#### **Network Delete Payload**

Short description field: - del\_network Description Field: Copy the below JSON payload

{
 "address": "20.0.0.0",
 "organization\_name": "Internal"
}

# Zone Resource Record (A Record) Add Payload

Short description field: - add\_rr Description Field: Copy the below JSON payload

{

"zoneName": "snow.com", "owner": "ARecord", "rrclass": "IN", "rttype": "A", "ttl": "1200", "data": "10.0.0.2", "description": "", "is\_external\_rr": 0, "status": 1, "organization\_name": "Internal"



# Zone Resource Record (CNAME Record) Add Payload

Short description field: - add\_rr Description Field: Copy the below JSON payload

{

"zoneName": "snow.com", "owner": "CRecord", "rrclass": "IN", "rrtype": "CNAME", "ttl": "1200", "data": "ARecord.snow.com.", "description": "", "is\_external\_rr": 0, "status": 1, "organization\_name": "Internal"

}

# Zone Resource Record (CNAME Record) Delete Payload

Short description field: - del\_rr Description Field: Copy the below JSON payload

{

"zoneName": "snow.com", "organization\_name": "Internal", "rrtype": "CNAME", "rrclass": "IN", "owner": "CRecord.snow.com.", "data": "ARecord.snow.com."



# Zone Resource Record (A Record) Delete Payload

Short description field: - del\_rr Description Field: Copy the below JSON payload

"zoneName": "snow.com", "organization\_name": "Internal", "rrtype": "A", "rrclass": "IN", "owner": "ARecord.snow.com.", "data": "10.0.0.2"

}

{

#### **DHCP Scopes Delete Payload**

Short description field: - del\_scope Description Field: Copy the below JSON payload

[{

"addressRange": "1.0.0.3-1.0.0.10", "subnetAddress": "1.0.0.0", "organization\_name": "Internal"

}]



#### **DHCP Scopes Add Payload**

Short description field: - add\_scope Description Field: Copy the below JSON payload

{

```
"scope": {
       "addressRanges": [{
              "startIP": "1.0.0.3",
              "endIP": "1.0.0.10"
       }],
       "allocation_type": "dynamic",
       "allowClassesArray": [],
       "class_code": "3G Phone",
       "denyClassesArray": [],
       "description": "",
       "organization_name": "Internal",
       "primary_dhcp_server": "DNSAppliance",
       "template_name": "ServiceNow"
},
"subnetAddress": "1.0.0.0",
"update_ns_a": true,
"update_ns_ptr": true,
"dyn_update_rrs_a": true,
"dyn_update_rrs_cname": true,
"dyn_update_rrs_mx": true,
"dyn_update_rrs_ptr": true,
"ttl": 1200
```



#### **DHCP Manual Object Add Payload**

Short description field: - add\_object Description Field: Copy the below JSON payload

{

"name": "DHCPManualObject", "class code": "3G Phone", "alloc\_type": "2", "mac": "E1:aa:BB:CC:DD:EE", "ttl": "1200", "option\_template\_name": "ServiceNow", "dhcp\_server": "DHCPAppliance", "update ns a": true, "update\_ns\_ptr": true, "dyn\_update\_rrs\_a": true, "dyn\_update\_rrs\_ptr": true, "dyn\_update\_rrs\_cname": true, "dyn\_update\_rrs\_mx": true, "addr1": "1", "addr2": "0", "addr3": "0", "addr4": "11", "subnet\_address": "1.0.0.0", "domain\_name": "abc.com", "organization\_name": "Internal"



#### **DHCP Manual Object Delete Payload**

Short description field: - del\_object Description Field: Copy the below JSON payload

"addressArray": ["1.0.0.11"], "isDeleterrsChecked": 1, "organization\_name": "Internal"

# **IPAM Static Object Add Payload**

Short description field: - add\_object Description Field: Copy the below JSON payload

{

{

}

"addr1": 1, "addr2": 0, "addr3": 0, "addr4": 12, "name": "CRMServer", "alloc\_type": 1, "class\_code": "CRM Server", "domain\_name": "abc.com", "organization\_name": "Internal", "subnet\_address": "1.0.0.0"



# **IPAM Static Object Delete Payload**

Short description field: - del\_object Description Field: Copy the below JSON payload

> "addressArray": ["1.0.0.12"], "isDeleterrsChecked": 1, "organization\_name": "Internal"

}

{