# **ServiceNow Integration**





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## Introduction

Enterprises that use TCPWave IPAM can leverage seamless integration with ServiceNow workflows. Activities, such as Change Request Approval, Reporting an Incident, and Planning a Corrective Plan of Action, that are performed in a workflow in ServiceNow can invoke Script Include functions. These functions can securely make API calls to TCPWave IPAM to invoke DDI functionality in it.

To enable users to understand and take advantage of TCPWave's integration with ServiceNow, information on the following topics is presented below:

- Architecture and overview of TCPWave and ServiceNow integration
- Configuration of TCPWave and ServiceNow needed for integration
- Workflows in ServiceNow that TCPWave supports
- Example values in Change Requests in ServiceNow

## **TCPWave Integration with ServiceNow**

## **Architecture Overview**

The architecture diagram below provides an overview of how user actions in a workflow in ServiceNow can invoke REST API calls to TCPWave IPAM. ServiceNow and TCPWave IPAM communicate securely over the API using HTTPS (HTTP with SSL).



As an example, a summary of the main steps in a workflow for a Change Request to add a DNS domain in TCPWave IPAM is provided below. The Description field in the Change Request contains a JSON payload



that contains the attributes and associated values that are needed to make the change in TCPWave IPAM.

- 1. A user approves a Change Request in the Change Request Approval activity.
- 2. In the Request Moderator activity, a Script Include function is invoked for an Add DNS Domain action.
- 3. The Request Moderator activity initiates an API REST call to TCPWave IPAM to add the domain.
- 4. ServiceNow and TCPWave IPAM perform authentication by doing an SSL handshake and exchanging certificates in their key stores.
- 5. TCPWave IPAM accepts the request to add the DNS domain and adds it.

## ServiceNow Versions Supported by TCPWave

The following versions of ServiceNow are supported by TCPWave:

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

## **Configuration of TCPWave and ServiceNow**

To have ServiceNow invoke functionality in TCPWave, first configure authentication in TCPWave and ServiceNow. Then configure Script Include functions, workflows, and Change Requests in ServiceNow.

#### **Configuring Authentication**

An example of configuring authentication in TCPWave and ServiceNow using self-signed SSL certificates is presented in the steps below. However, for improved security, TCPWave highly recommends using valid certificates signed by trusted authorities.

1. Create a root certificate by 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

2. In TCPWave IPAM, import the files snowAppCA.crt and snowAppCA.key created in the previous step as a certificate for an appliance. When doing the import, ensure that **Trust CA** is selected as shown in the screenshot below.



	î↓ Owner	Serial Number	Iss	uer	î↓
	Ma	Import Certificate		×	
	Su	Certificate File*			1
_untrusted	Citi	snowAppCA.crt			Intrusted
	10.	Private Key File			
	*.tc	snowAppCA.key			1
m	AD	Private Key Password			-
	pol			-	1
		Certificate Storage Password*		_	
		✓ Trust CA			
		ОК		CANCEL	

3. Create a user certificate by using the following commands: openssl genrsa -out snowApp.key 2048

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

4. Sign the user certificate by root CA by using the following command:

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

5. Import the user certificate in the file snowApp.crt created in the previous step into TCPWave IPAM, as shown in the screenshot below. This step is required to associate all incoming HTTP requests that use this certificate with an IPAM user.

× 4	3	2			
O			Import Certificate		×
	*	Certificate File* snowApp.crt Associated Admin*			Inc., L=Princeton,
ng 1 to 4	of 4 ent	twcadm		▼	
	l			DK CANCI	EL

6. Generate a certificate in PKCS12 format by using the following command:



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

7. In ServiceNow, import the TCPWave SSL Certificate in the file snowWave.pkcs12 created in the previous step, as shown in the screenshot below.

Servicence Service Management				💮 System	Administrator 👻	ର୍ ଜୁ	? ‡
(7 certificates	K S09 Certifica Manohar-Certs	te		Ø	ooo Update	Delete	$\uparrow \downarrow$
0 ★ ⊡	Manage Attachments (1):	snowWave.pkcs12 [rename] [download]					
System Definition	* Name	TCPWave-ServiceNow	Type	PKCS12 Key Store	~		
Certificates	* Notify on expiration	음 System &dministrator	Expires in days				
System LDAP	* Warn in days to	20	Keystore password				
Certificates	expire Active	∑					
	Short description	TCPWave SSL Certificate					
	Update Delete						
	Related Links Validate Stores/Certificates						

8. In ServiceNow, define an association between a unique protocol and a key store and default port, as shown in the screenshot below.

				i System Admin	istrator • 오다 ⑦ @
🖓 protocol 🛞	< Protocol Profile myhttps			Øŧ	update Delete 🛧 🤟
<b>≡ ★</b> ©					
System Security	Defines an association between	a unique protocol and a keystore and defa	ult port. <u>More info</u>		
Protocol Profiles	* Protocol my	https	Keystore	TCPWave-ServiceNow	۹ 0
	Default port 744	13			
	Update Delete				

#### **Configuring Script Include Functions in ServiceNow**

In ServiceNow, Script Include functions can be created to make API calls to TCPWave IPAM to invoke DDI functionality in it. These functions are runnable JavaScript functions that can be created in the ServiceNow web UI. They can use the native ServiceNow JavaScript API to perform executable actions, such as invoking outbound HTTP REST calls. Consequently, these functions can perform various RESTful actions in TCPWave IPAM.

The screenshot below shows an example Script Include function in ServiceNow for adding a domain in TCPWave IPAM. Additional example JavaScript code snippets are provided in the TCPWave Git Repository. You can use these examples as a basis to create the Script Include functions that you need.



	TCPWave_Domain_Add	Application	Global	0
API Name	global.TCPWave_Domain_Add	Accessible from	This application scope only	
Client callable		Active		
Description	To add domain			
Script	\$ <b>. . . . . . . .</b>	8 %		
	<pre>2</pre>	<pre>spr2(); ; statuse.com;740/tims/rest/omsic/add"); statu(); statuse.com;740/tims/rest/omsic/add"); statuse.com; statuse.com; statuse.com; tent; tent;</pre>		
Protection policy				

## **Configuring Workflows in ServiceNow**

Workflows in ServiceNow can be configured to be invoked on demand based on various ongoing activities in ServiceNow, such as the approval or implementation of a Change Request. TCPWave IPAM integration with change events in ServiceNow is done by using workflow transitions that use JavaScript directives to retrieve Change Request information and invoke Script Include functions.

As an example of the configuration of a workflow in ServiceNow, the configuration of a simple one named TCPWave\_Integration is presented in subsequent screenshots. You can use this example as a basis to create the workflows that you need. For TCPWave\_Integration, general information on it is shown in the screenshot below, including that it operates on the Change Request Table.

Workflow Properties												×
	ersion - TCPWave_Inte	gration [Diagramm	ver view*]				P	ŧ	000	Update	Delete	]
												^
General Conditions	Ind visualizes a multi-	Application	Schedule	Estimated Pure	ima							I
CONTRACT CONTRACTS	* Name	TCPWave_Integr	ation	Estimated Nam		Checked out 12/10/24	018 12:20:04					
	> Table	Change Request	[change_req	uest]	•	Checked out by manoha	ar k					
	Published											I
	Description											I
Undate Delete												
Related Links												
Default view Diagrammer view												I
												I
												I
												I
												l
4												; •
4												*

This workflow runs when two conditions are met: the Short Description is add\_domain and the Approval status is Approved. These conditions are shown in the following screenshot.



workflow automates and visualizes a r	ulti-step process as a sequence of activ	rities. <u>More Info</u>			
eneral Conditions Inputs Act	vities Application Schedule Es	timated Runtime			
pecify at least one Condition to trigge on the workflow: Workflow(s) start in	the workflow. Select one of the followi uccession according to the Order colum	ng options to determine wh nn each time an inserted re	at happens when a record inserted on ord matches the condition.	the selected table matches the condition:	
un if no other workflows matched yet one: The workflow does not start unly	The workflow starts when a record mat ss it is triggered by a subflow or script.	tches the condition, only if	to other workflows are running on the	record.	
If condition matches	Run the workflow always	•		Order	100
Condition	Add Filter Condition Add "O	R" Clause			
	All of these conditions must be	met			
	Short description	▼ is	<ul> <li>add_domain</li> </ul>	AND OR X	
	Approval	▼ is	• Approved	· AND OR X	
Jpdate Delete					
Update Delete					

The TCPWave\_Integration workflow is shown in the figure below. The activity named Run Script in the workflow invokes a script that retrieves information from a Change Request. This information includes the type of Change Request, which is in the Short Description field, and the JSON payload, which is in the Description field. Example values for Short Description are add\_domain and add\_static\_object.

Welcome	o∦ TCPWave_In	tegration	o∦ TCPWave	e_Integration	
ТСРИ	Vave_Integration -	Checked of	ut by me		
Begin	n	90 Pur	Script	0	
Always	;	Stage: C Call_Scri	omplete pt_Includes	0	
			Always	-	
					∳ Issi End
					End

The script that Run Script runs is shown in the screenshot below. As seen in this script, it checks the Short Description field for the value add\_domain in a Change Request and then invokes an associated Script Include function to add the domain.



Workflow	Activity - Call_Script_	Includes [Diagrammer view"]	Ø	to oo Updat
	Name	Call_Conje_Exclude		
	Stage	Complete	٩ 0	
Script				~
he Run Script activ	rity runs the specified	script in the scope of the workflow version. <u>More info</u>		
	Script	Image: Section Control Section Sectio	>	
ited Links				

## **Defining Change Requests in ServiceNow**

An example of part of the definition of a Change Request in ServiceNow is shown in the screenshot below. In it, a value that identifies the type of request is specified in the Short Description field. Also, a JSON payload that contains the attributes and associated values that are needed to make the change in TCPWave IPAM is specified in the Description field. Additional example values for these two fields are presented in the appendix, and you can use these examples as a basis to define the Change Requests that you need.

t description add_e	object	8
Description	['mame': "usdb-instance", "class_code": "Database Server", "alloc.yps": "J", "update_ms_pdf: true, "update_ms_pdf: true, "dym_update_rrs_a": true, "docsmupdate_rrs_a": true, "d	

#### **Resulting Workflow Output**

After an authorized administrator approves a Change Request in ServiceNow, the configured workflow for it runs. The following figure shows the successful execution of a version of the TCPWave\_Integration workflow that was modified to add a static object.



Skip to Main Content al TC	CPWave_Integration
State: Finished 12/10/2018 12:	:23:47 - 12/10/2018 12:23:48
Begin - Finished Begin Always	Run Script         - Finished         Stage: Complete         Call_Script_Includes         Always         End         - Finished         End

As a result of completing the workflow, a static object named AWS00001Instance.aaa.com with an Object Type of AWS Instance was created in TCPWave IPAM, as shown in the screenshot below.

TCPWave Bashboard	20	aick Tas	ks	BI Network Management +			ntrastructure Management +		@ Reports -	📽 Administration +							
1		IPV	4 Netv	iorks	> 99.4.0	0.0/16	Subnets	99.4.0.0/22	Objects								
		20	~	C	8	11	5 D	1 1	4	н с	*						
Appliance Groups			0		Address	11	Name 11	Domain 11	Object Type	Created By	Created Time	Updated By	Updated Time	Allocation Type	MAC 11	Serial Number	Time to L
BULK DATA OPERATIONS	*	0	0	=	99.4.0.1		outer-935246	aaa.com	Router	twcadm	09:19:37 10-15-2018			Static			
CLOUD MANAGEMENT	-	0	Ο		99.4.0.2									Unallocated			
		0	0		99.4.0.3									Unallocated			
DHCP MANAGEMENT	Ŧ	0	0		99.4.0.4									Unallocated			
DNS MANAGEMENT		0	0		99.4.0.5									Unallocated			
		0	0	0	99.4.0.6	1	AWS00001Instance	aaa.com	AWS Instance	twcadm	10:12:20 10-15-2018	twcadm	16:22:28 10-15-2018	Static			1200

## Workflows Supported by TCPWave

TCPWave supports the workflows below. Example values for the Short Description and Description fields in Change Requests in ServiceNow for some of these workflows are presented in the appendix.

- Network
  - $\circ \ \ \text{Create Network}$
  - Delete Network
  - List Networks
- DNS
  - Create "A" Record
  - Delete "A" Record
  - $\circ \ \ \text{Create CNAME Record}$
  - Delete CNAME Record
- DHCP
  - $\circ \ \ \text{Create Scope}$
  - $\circ \ \ \, \text{Delete Scope}$
  - Create DHCP Manual Object
  - o Delete DHCP Manual Object



- IPAM
  - Get Next Free Available IP
  - Create Static Object
  - Delete Static Object
  - o Edit Object
  - o Delete Object
  - $\circ$  Add Object RR
  - Edit Object RR
  - Delete Object RR
  - Add Zone RR
  - o Edit Zone RR
  - o Delete Zone RR

## Advantages of ServiceNow Integration

The many web services offered by TCPWave DDI can be extensively leveraged from ServiceNow (and similar applications) to quickly, securely, and automatically perform Change Request management and needed DDI activities. Also, the SSL-based authentication and encrypted data exchange used by TCPWave and ServiceNow ensure a trusted connection between them. Enterprises that use TCPWave DDI can seamlessly integrate it with ServiceNow and create custom workflows to meet nearly any need to accomplish safe and secure DDI workflow automation.



## **Appendix: Example Values in Change Requests for DDI Operations**

Example values for the Short Description and Description fields in Change Requests in ServiceNow are presented in the sections below. Each section is for a specific type of DDI operation. The Short Description field contains a value for the type of Change Request, which corresponds to the type of DDI operation. The Description field contains a JSON payload that contains the attributes and associated values needed to make the change in TCPWave IPAM.

These sections are organized by DDI topic in the following sequence:

- 1. Network
- 2. Zone Resource Record
- 3. DHCP Scope
- 4. DHCP Manual Object
- 5. IPAM Static Object

## Network Add

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

{

"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**

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

> "address": "20.0.0.0", "organization\_name": "Internal"

}

{

## Zone Resource Record Add for "A" Record

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

{

```
"zoneName": "snow.com",
"owner": "ARecord",
"rrclass": "IN",
"rrtype": "A",
"ttl": "1200",
"data": "10.0.0.2",
"description": "",
"is_external_rr": 0,
"status": 1,
"organization_name": "Internal"
```

## Zone Resource Record Delete for "A" Record

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

{

}

```
"zoneName": "snow.com",
"organization_name": "Internal",
"rrtype": "A",
"rrclass": "IN",
"owner": "ARecord.snow.com.",
"data": "10.0.0.2"
```



## Zone Resource Record Add for CNAME Record

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

{

```
"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 Delete for CNAME Record**

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

{

```
"zoneName": "snow.com",
"organization_name": "Internal",
"rrtype": "CNAME",
"rrclass": "IN",
"owner": "CRecord.snow.com.",
"data": "ARecord.snow.com."
```



## **DHCP Scope Add**

{

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

```
"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 Scope Delete**

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

{

}

```
"addressRange": "1.0.0.3-1.0.0.10",
"subnetAddress": "1.0.0.0",
"organization_name": "Internal"
```



## DHCP Manual Object Add

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

{

```
"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**

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

{

```
"addressArray": ["1.0.0.11"],
"isDeleterrsChecked": 1,
"organization_name": "Internal"
```



## IPAM Static Object Add

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

{

"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**

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

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

}

{