

Constraints

Constraints

The screenshot shows the 'Constraints' tab in the IPAM Admin interface. The top navigation bar includes 'Settings', 'IPAM Admin', 'Data Import', 'Users', 'API', 'Scheduler', 'Log', 'Approvals', 'Constraints', and 'Exit Admin'. A search bar is located on the right. Below the navigation bar, there are tabs for 'Constraints' and 'Configuration', with a 'Settings' button on the right. The 'Configuration' tab is active, showing a 'Configuration' header with an 'Add constraint' button. Below this, a 'Registered constraints' section shows 6 items. A table lists the constraints with columns for 'ID', 'Name', 'Compare', 'Updated', and 'Options'. Two constraints are visible: ID 11966 named 'colors' with type 'Enumeration', and ID 11967 named 'Resource Holder Entries' with type 'Section Entry'. Both were updated on 03/30/2021. Each row has 'Delete', 'Edit', and 'Test' buttons.

ID	Name	Compare	Updated	Options
11966	colors	Enumeration	03/30/2021 19:36:10	Delete Edit Test
11967	Resource Holder Entries	Section Entry	03/30/2021 19:21:51	Delete Edit Test

The Constraints system allows Admin users to configure custom field validation and limitations into IPAM fields. Many constraint types are available, such as mathematical comparison operators, length, enumeration, pre-set lists, RegEx, IPv4/IPv6, Phone, email, hostname, FQDN, Mac Address, and URL.

The **Constraints** Tab has one sub-tab - **Configuration** - where new constraints may be created and managed.



Currently, **Constraints** is available only for **IPAM** related actions, while we gather feedback and use cases to inform possible future updates. If you are interested in providing feedback, a use case, or requests for future additions to the Constraints system, please contact feedback@6connect.com.

- Constraints
- Constraints Tab - Overview
- Available Constraint Types
- Add a Constraint
- Test Constraint
- Edit Constraint
- Delete Constraint
- Working with Constraints in IPAM Manage
- Example: Adding an Enumeration / Constraint Containing Children
 - Create the Parent Constraint
 - Open the Parent Constraint
 - Add Child Items
 - Using the Enumeration
- Additional Information

Constraints Tab - Overview

The Constraints Tab, available to Admin users, allows for custom field validation and field restrictions to be applied to IPAM fields. The applied constraint may be anything from a numerical comparison operation, a check against a pre-determined text string, ensuring selections from a pre-set list, or forcing entries into a specific format, such as IPv4/IPv6, phone number, or RegEx.

These constraints can be applied to the following IPAM fields:

- ASN
- Custom Generic Field
- Notes
- Metadata 1-10, if enabled for the instance

Depending on the type of constraint applied, the constraint may be a simple single-value comparison needing only one constraint to be created, such as "Equals to" or "Length Max". Some other constraint types, however, may have two or more levels deep of constraint types and value checks. One example of this is "Enumeration", which requires the user to first set up an "Enumeration" constraint, and then a second level list of sub-constraint types or a list of values. For a detailed constraint tree, it may be worth

Available Constraint Types

The following constraint types are currently available:

Type	Description
Enumeration	Create a list of child enum items. Note: Set binding / control type for parent constraint (enumeration) only, do not provide for child items. <u>Children type</u> : Valid child enum types are: =, !=, , , =, regex, allow, oneof, allof, ip, ipv4, ipv6, email, url, hostname, fqdn, mac, phone, lenmax, lenmin, section_entry
Section Entry	Creates an enumeration based on all entries that belong to a given section.
Equals to	Checks to ensure a value is exactly equal to a provided value, e.g. (X == Y) is true
Not Equal to	Checks to ensure a value is not equal to a provided value, e.g. (X != Y) is true
Greater Than	Checks if the input value (left operand) is greater than a given value (right operand). e.g. (X > Y) is true
Less Than	Checks if the input value (left operand) is less than a given value (right operand). e.g. (X < Y) is true
Greater Than or Equal to	Checks if the input value (left operand) is greater than or equals to a given value (right operand). e.g. (X >= Y) is true
Less Than or Equal to	Checks if the input value (left operand) is less than or equals to a given value (right operand). e.g. (X <= Y) is true
One of	Create a list of child constraint items. It will be true if one of child constraints is true. Its children must be previously configured. Note: Set binding / control type for parent constraint (enumeration) only, do not provide for child items.
All of	Create a list of child constraint items. It will be true if all of the child constraints are true. Its children must be previously configured. Note: Set binding / control type for parent constraint (enumeration) only, do not provide for child items.
Length Max	Checks to ensure a string has, at most, the specified number of characters
Length Min	Checks to ensure a string has, at minimum, the specified number of characters
Regular Expression	Compares the input format to a provided Regular Expression
IPv4	Sets the required format for the input to an IPv4 address
IPv6	Sets the required format for the input to an IPv6 address
Email	Sets the required format for the input to an email address (uses an "@" symbol)

Hostname	Sets the required format for the input to a hostname. Hostnames may not have underscore or dash characters.
FQDN	Sets the required format for the input to a FQDN
MAC Address	Sets the required format for the input to a MAC address
URL	Sets the required format for the input to a url
Phone Number	Sets the required format for the input to a phone number

Add a Constraint

To add a new Constraint, click "Add Constraint"

The screenshot shows the 'Configuration' tab of a constraints management system. At the top, there are tabs for 'Constraints', 'Configuration', and 'Settings'. The 'Configuration' tab is active. Below the tabs, there's a section titled 'Configuration' with a green 'Add constraint' button circled in red. Underneath, a blue bar indicates 'Registered constraints 4'. A filter section shows 'Filter by Type: none' and a search bar. Below that, it says '0 items selected.' and a table with one row of data.

ID	Name	Compare	Updated	Options
15367	ConstA	Greater than or Equals to	07/27/2020 15:54:00	Delete Edit Test

In the "Add Constraint" screen, select (at minimum, depending on the selected constraint type):

- The constraint type (here, "Length Min")
- The name for the constraint
- The attribute (IPAM Field) on which to apply the constraint
- Constraint specific comparison values, here as "Length"
- Select whether to allow empty values in the attribute field

If desired, you may enter a custom error message, customize the UI binding (although it is automatically filled in if you select a standard IPAM Attribute), or add an event hook setting.

Add constraint

Constraints / Add new

Common settings

Constraint type

Length Min

Allows strings with more than "lenmin" characters. (string.length > X) is true

Name

Length Min 3

The title of this constraint.

Attribute name

Metadata8

Attribute that will be evaluated.

Length

3

Minimum string length

☒ Allow empty values

Error message

custom description...

Include a custom message when the constraints fails. Messages can be formatted using the available template variables. E.g.: "The constraint {name} has failed on {attribute} caused by: {error}"

UI Binding

Control Type

Input Field

Indicate the kind of control that the UI element represents

Element id

meta8

The object's property in which you want to apply a constraint. Most of the times, the element_id will correspond to the attribute name but something the UI could use a different id.

Hook settings

Type

No hook

Choose the type of hook to register.

Add constraint

Cancel

When done, click "Add Constraint" to save.

Test Constraint

To test a Constraint, click "Test".

Registered constraints 5

Filter by Type: none

Search...

0 items selected.

<input type="checkbox"/>	ID	↑ Name	↑ Compare	↑ Updated	Options
<input type="checkbox"/>	15367	ConstA	Greater than or Equals to	07/27/2020 15:54:00	<div>DeleteEditTest</div>
<input type="checkbox"/>	15368	ConstB	Greater than	07/27/2020 15:54:30	<div>DeleteEditTest</div>
<input type="checkbox"/>	15530	One of List ↗	One of	08/10/2020 13:30:25	<div>DeleteEditTest</div>
<input type="checkbox"/>	15532	Enumeration Metadata 9 ↗	Enumeration	08/10/2020 13:50:08	<div>DeleteEditTest</div>
<input type="checkbox"/>	15535	Length Min 3	Length Min	08/10/2020 15:30:00	<div>DeleteEditTest</div>

Displaying 1 to 5 of 5 items

The test constraint form will appear - enter a test value, and you can check whether the constraint returns an appropriate invalid or valid response:

Invalid result, for "Length Min 3":

Test Constraint

Try '**Length Min 3**' constraint by entering a value in the input below:

Enter Value

✖

Constraint Length Min 3 condition has not been met.

Cancel

Valid result, for "Length Min 3":

Test Constraint

Try '**Length Min 3**' constraint by entering a value in the input below:

Enter Value

✔

Valid input

Cancel

Edit Constraint

To edit a Constraint, click "Edit". The constraint details will open, matching the "Add Constraint" form.

Registered constraints 5

Filter by Type: none

Search...

0 items selected.

<input type="checkbox"/>	ID	Name	Compare	Updated	Options
<input type="checkbox"/>	15367	ConstA	Greater than or Equals to	07/27/2020 15:54:00	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15368	ConstB	Greater than	07/27/2020 15:54:30	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15530	<a>One of List	One of	08/10/2020 13:30:25	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15532	<a>Enumeration Metadata 9	Enumeration	08/10/2020 13:50:08	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15535	Length Min 3	Length Min	08/10/2020 15:30:00	<a>Delete <a>Edit <a>Test

Displaying 1 to 5 of 5 items

Adjust values or settings as desired, and then click "Update Constraint".

Delete Constraint

To delete a Constraint, click "Delete".

Registered constraints 5

Filter by Type: none

Search...

0 items selected.

<input type="checkbox"/>	ID	Name	Compare	Updated	Options
<input type="checkbox"/>	15367	ConstA	Greater than or Equals to	07/27/2020 15:54:00	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15368	ConstB	Greater than	07/27/2020 15:54:30	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15530	<a>One of List	One of	08/10/2020 13:30:25	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15532	<a>Enumeration Metadata 9	Enumeration	08/10/2020 13:50:08	<a>Delete <a>Edit <a>Test
<input type="checkbox"/>	15535	Length Min 3	Length Min	08/10/2020 15:30:00	<a>Delete <a>Edit <a>Test

Displaying 1 to 5 of 5 items

A Confirmation box will appear - confirm whether to delete the constraint, or click "Close" to exit without deletion.

Please confirm.

Are you sure you want to remove **Length Min 3**?

Remove

Close

Working with Constraints in IPAM Manage

When a field is viewed in IPAM Manage that has a constraint applied, a "check" icon will display next to the field input for simple input constraint checks, if empty values are allowed.

If the constraint is of a type that has been set up with a dropdown box, then the dropdown box and placeholder text will be applied:

Edit Attributes: 1.1.0.16/28 (1.1.0.16 - 1.1.0.31)

Assigned to: aaQAEntry 2 Clone Test → Subnet Smart IPv4 pool

RIR:1918

LIR:

Domain:select a domain... ✕

Custom Generic Code:

Region:St. Louis

Tags:✕ 1abc QA

Notes:

Allow sub assignments for this block:OFF

Propagate attributes to all children:OFF

Mark this block as important:OFF

VLAN:

ASN:

Metadata2:

Metadata3:

Metadata4:✓

Metadata5:

Metadata6:

Metadata7:✓

Metadata8:✓

Metadata9:

Metadata10:enter value... ←

Close

Save

In this example, constraint validation checks have been applied to Metadata4, Metadata7, and Metadata8, with a dropdown "One Of" constraint applied to Metadata 10.

Metadata8 has been associated with our previous constraint example, "Length Min 3", so if we enter less than three characters into that field, we should get an error, and see the "X" for the input not meeting the constraint settings:

Edit Attributes: 1.0.0.0/16 (1.0.0.0 - 1.0.255.255)
Assigned to: 3M

RIR:	1918	LIR :		Metadata3:	
Domain:	select a domain... ✕	VLAN:		Metadata4:	✓
Custom Generic Code:		ASN:		Metadata5:	
Region:				Metadata6:	
Tags:	Select tags...			Metadata7:	✓
Notes:				Metadata8:	ab ✕
Allow sub assignments for this block:			<input type="radio"/> OFF	Metadata9:	
Propagate attributes to all children:			<input type="radio"/> OFF	Metadata10:	enter value...
Mark this block as important:			<input type="radio"/> OFF		

Close Save

On the other hand, a valid input will return to displaying the "valid" success checkmark:

Edit Attributes: 1.0.0.0/16 (1.0.0.0 - 1.0.255.255)
Assigned to: 3M

RIR:	1918	LIR :		Metadata3:	
Domain:	select a domain... ✕	VLAN:		Metadata4:	✓
Custom Generic Code:		ASN:		Metadata5:	
Region:				Metadata6:	
Tags:	Select tags...			Metadata7:	✓
Notes:				Metadata8:	abc ✓
Allow sub assignments for this block:			<input type="radio"/> OFF	Metadata9:	
Propagate attributes to all children:			<input type="radio"/> OFF	Metadata10:	enter value...
Mark this block as important:			<input type="radio"/> OFF		

Close Save

Example: Adding an Enumeration / Constraint Containing Children

This example shows how to add a two-level constraint, such as Enumeration, All of, or One of - all of which are set up having a "parent" constraint at the top level list, and "child" items or constraints on a sub-level. Here, we will be using Enumeration as the example constraint, although All of and One of may be created similarly - just using the "add constraint" button to create children instead of the "add item" button.

Create the Parent Constraint

From the Constraints "Configuration" page, click "Add Constraint".

Constraints

Configuration

Settings

Configuration

Add constraint

Constraints

Registered constraints 4

Filter by Type: none

Search...

0 items selected.

<input type="checkbox"/>	ID	Name	Compare	Updated	Options
<input type="checkbox"/>	15367	ConstA	Greater than or Equals to	07/27/2020 15:54:00	<div>DeleteEditTest</div>

Select "Enumeration" for the constraint type, and enter a name, attribute binding, and select the Control type - here, we will be using a dropdown control.

i For Parent/Child constraint types, you only need to enter the attribute binding and control type for the parent constraint, and do not need to enter these settings for the child items - those settings are inherited by the child items you will create later.

All other fields are optional, and may be skipped if desired.

Constraints / Edit Constraint

Common settings

Constraint type

Enumeration

Creates an enumeration of items.

Name

enum1

The title of this constraint.

Attribute name

Metadata8

Attribute that will be evaluated.

Children type

value...

The enum type of the children.

UI Binding

Control Type

Dropdown Control

Indicate the kind of control that the UI element represents

Element id

meta8

The object's property in which you want to apply a constraint. Most of the times, the element_id will correspond to the attribute name but something the UI could use a different id.

Page size

Items per page

☐ Multiple item selection

This option enables multi-select mode.

Placeholder

enter value...

Specifies the placeholder for the control

Hook settings

Type

No hook

Choose the type of hook to register.

Update constraintCancel

When done, Click "Update Constraint". You will see the new constraint added to the Constraints List.

Open the Parent Constraint




Constraints that have parent/child relations show as a blue link in the constraint list. Click on the constraint name to open the parent constraint to view or add child settings.

Registered constraints 6

Filter by Type: none

Search...

0 items selected.

<input type="checkbox"/>	ID	! Name	! Compare	! Updated	Options
<input type="checkbox"/>	15367	ConstA	Greater than or Equals to	07/27/2020 15:54:00	<div>DeleteEditTest</div>
<input type="checkbox"/>	15368	ConstB	Greater than	07/27/2020 15:54:30	<div>DeleteEditTest</div>
<input type="checkbox"/>	15530	One of List 	One of	08/10/2020 13:30:25	<div>DeleteEditTest</div>
<input type="checkbox"/>	15532	Enumeration Metadata 9 	Enumeration	08/10/2020 13:50:08	<div>DeleteEditTest</div>
<input type="checkbox"/>	15535	Length Min 3	Length Min	08/10/2020 15:46:52	<div>DeleteEditTest</div>
<input type="checkbox"/>	15538	enum1 	Enumeration	08/13/2020 12:41:45	<div>DeleteEditTest</div>

Displaying 1 to 6 of 6 items

Add Child Items

Once you have opened the parent constraint, here: Enumeration, you can add the child values that you wish to have listed as valid options.

For Enumeration, click "Add New Item", If using All of or One of types, then you will need to click "Add Constraint" to add child constraint items.

i For Parent/Child constraint types such as "All of" and "One of", you only need to enter the attribute binding and control type for the parent constraint, and do not need to enter these settings for the child items.

Configuration

Constraints / enum1

Enumeration 5

[< Back to Parent](#)
[Add new item +](#)
 Search... 🔍

0 items selected.

Add a new child enum item by entering a title, name/value, and the type. Typically, the type will be "=", for "equals this value".

Add enum item

Title

val1

Element title

Enum name

val1

Element value. This value will appears on results

Type

=

Type of enumeration

Clear Update Cancel

When done, click "Update", and repeat for any additional values that you wish to make available in your enumeration dropdown.

Here, we have added additional enum items to cover "val1" through "val 5".

Configuration

Constraints / enum1

Enumeration 5

< Back to Parent Add new item + Search...

0 items selected.

<input type="checkbox"/>	ID	! Name	! Enum Name	! Type	Options
<input type="checkbox"/>	15539	val1	val1	=	remove edit test
<input type="checkbox"/>	15540	val2	val2	=	remove edit test
<input type="checkbox"/>	15541	val3	val3	=	remove edit test
<input type="checkbox"/>	15542	val4	val4	=	remove edit test
<input type="checkbox"/>	15543	val5	val5	=	remove edit test

Displaying 1 to 5 of 5 items

From here, navigate back up to the parent constraint list that displays "enum1", and click "Test" (test will not work on individual child constraint items)

<input type="checkbox"/>	15538	enum1	Enumeration	08/13/2020 12:41:45	Delete Edit Test
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A display dropdown box will appear, click inside of it to confirm your child items show as selectable options.

Test Enumeration

Try 'enum1' enumeration by using the dropdown below:

select an item...

val1

val2

val3

val4

val5

Using the Enumeration

To see the constraint in action in IPAM Manage, navigate to a block and open Edit Block mode. Select the field that you applied the "enum1" element binding to (metadata 8, here), to view/select constraint items from the dropdown

Edit Attributes: 0.0.0.0/8 (0.0.0.0 - 0.255.255.255)

RIR: 1918

Domain: select a domain... x

Custom Generic Code:

Region:

Tags: Select tags...

Notes:

Propagate attributes to all children: OFF

Mark this block as important: OFF

LIR:

VLAN:

ASN:

Metadata3:

Metadata4: ✓

Metadata5:

Metadata6:

Metadata7: ✓

Metadata8: enter value...

val1

val2

val3

val4

val5

Metadata9:

Metadata10:

Additional Information

For additional information on working with IPAM Manage or IPAM Blocks, see

- [IPAM Tab](#)
- [IPAM Administration](#)