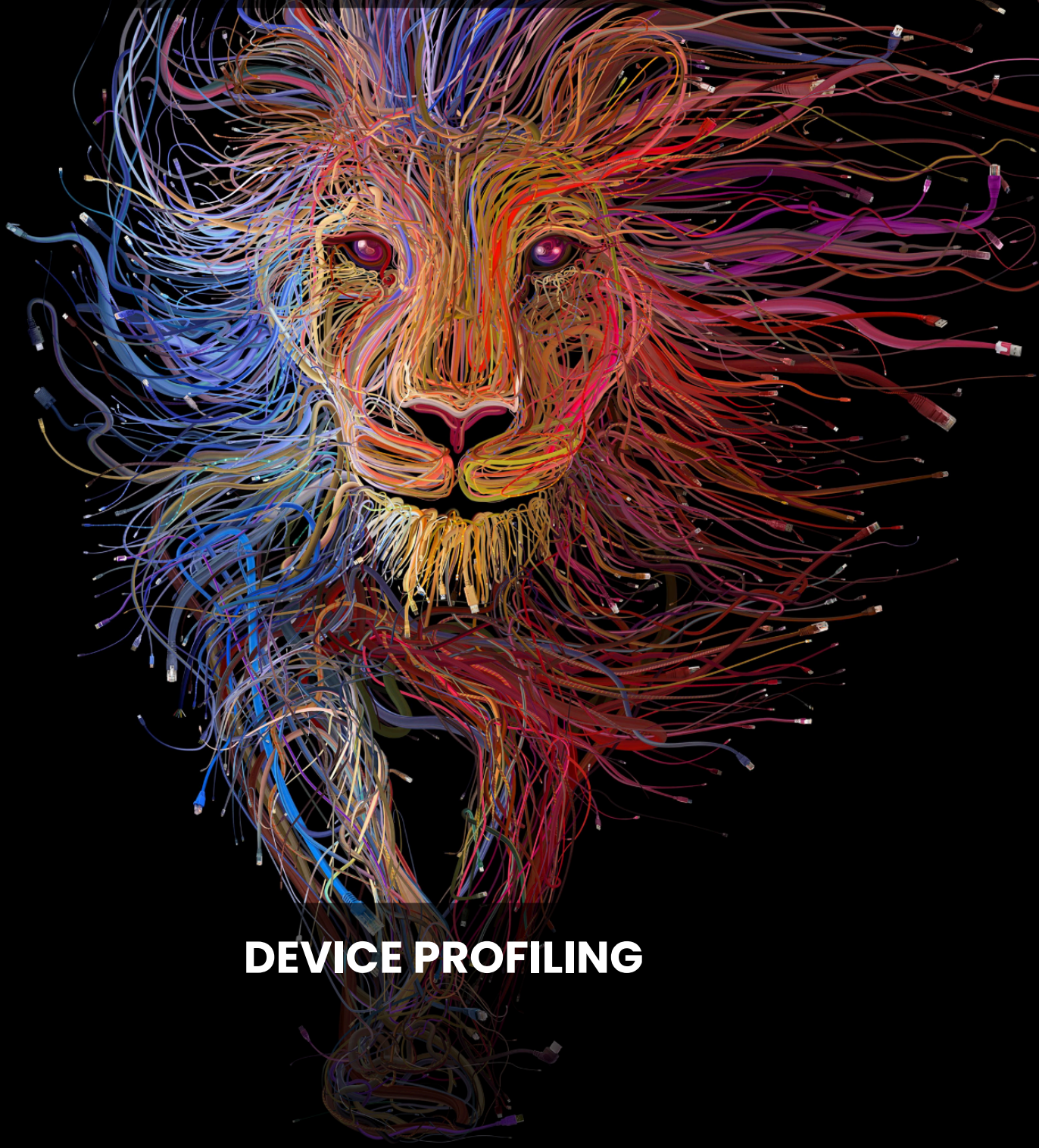
FastNAC



DEVICE PROFILING

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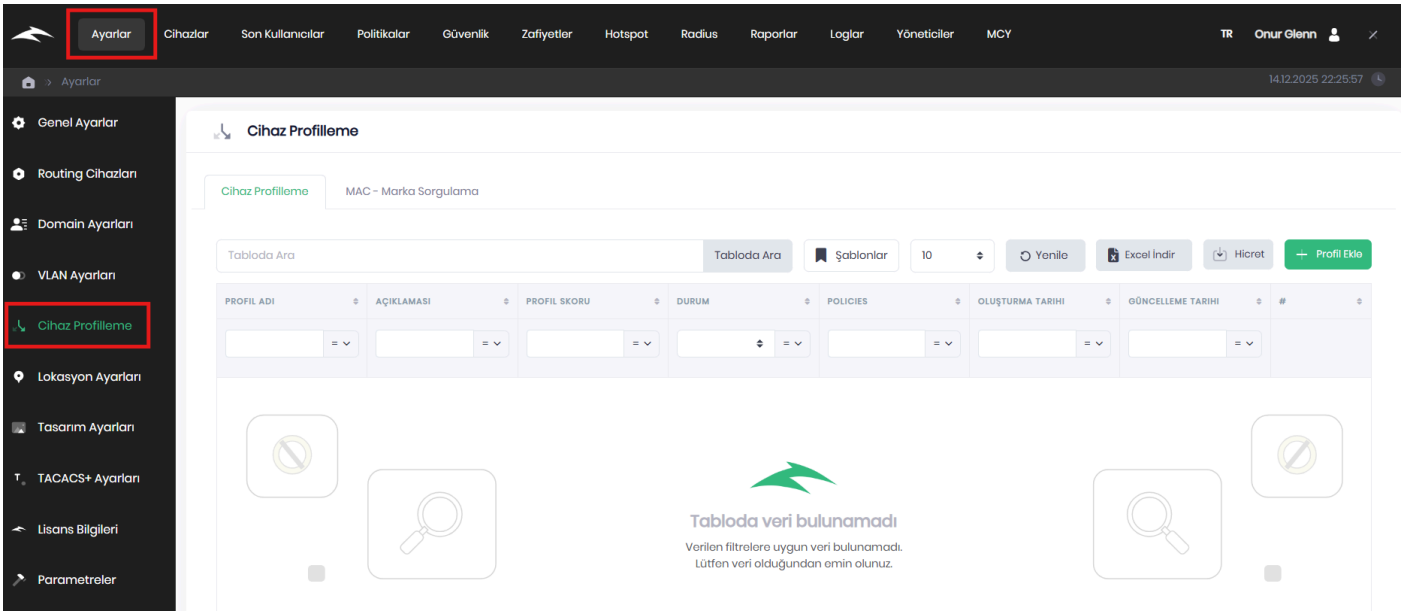
1. Beginning

FastNAC allows you to classify IoT or similar devices on your network using multiple profiling methods simultaneously. The devices can be categorized as follows:

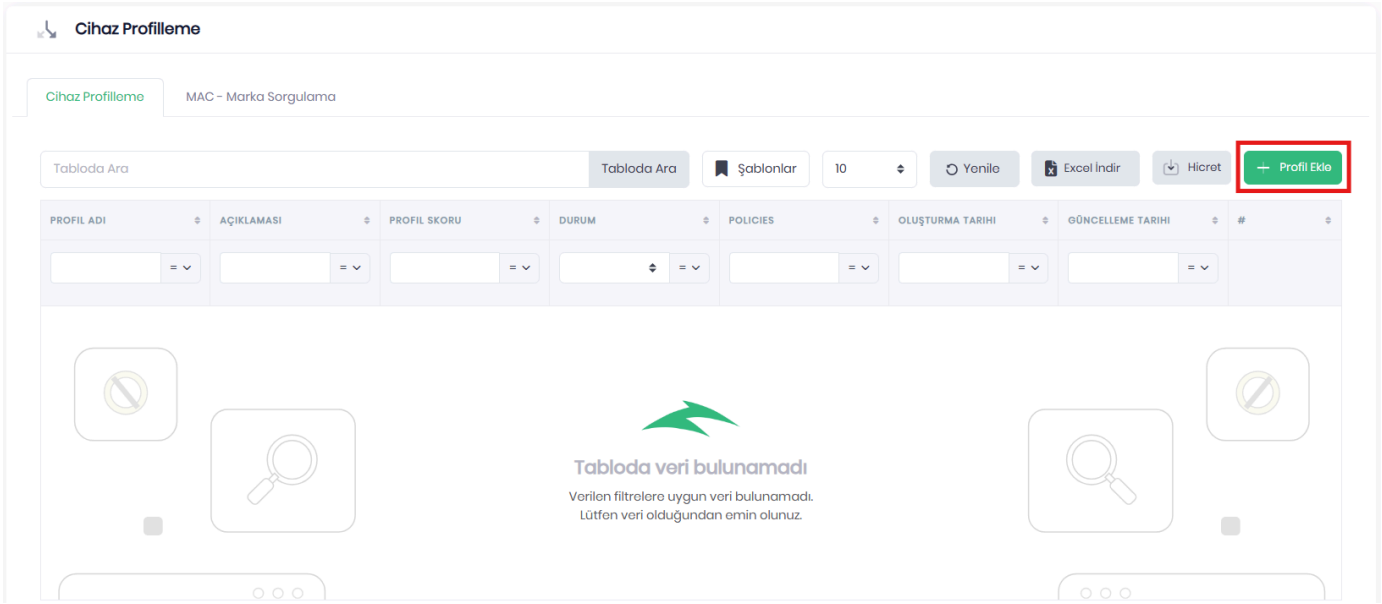
- Based on MAC addresses or MAC manufacturer information,
- Based on IP addresses or IP blocks,
- Depending on its location or Switch/Port information,
- According to Active Directory attributes,
- We scan the content using the HTTP/HTTPS method,
- By running a command via Telnet/SSH and analyzing the output,
- DHCP Fingerprint;
    - According to the manufacturer's information,
    - Based on the hostname,
    - According to fingerprint parameters
- Depending on TCP/UDP port status (open/closed/filtered),
- By sending an SNMP request and depending on the response received,
- For Windows operating system;
    - According to the operating system control,
    - Depending on whether the program is installed or not in Windows,
    - According to the version information of the program installed in Windows,
    - Depending on the situation, you can see which services are running/not running within Windows.
- For the Linux operating system;
    - According to the operating system control,
    - Depending on whether the program is installed or not in Linux,
    - According to the version information of the program installed in Linux,
    - In Linux, the services that are running/not running depend on the situation.
- Depending on the path of a file within the operating system,
- Based on login time,
- According to the results of the NMAP scan (you can use custom parameters),

You can classify them using methods such as these. You can access Device Profiling settings under **the Settings** -> **Device Profiling** menu.



2. Adding a Profile

You can create a new profile by clicking the "Add Profile" button on the Device Profiling screen.



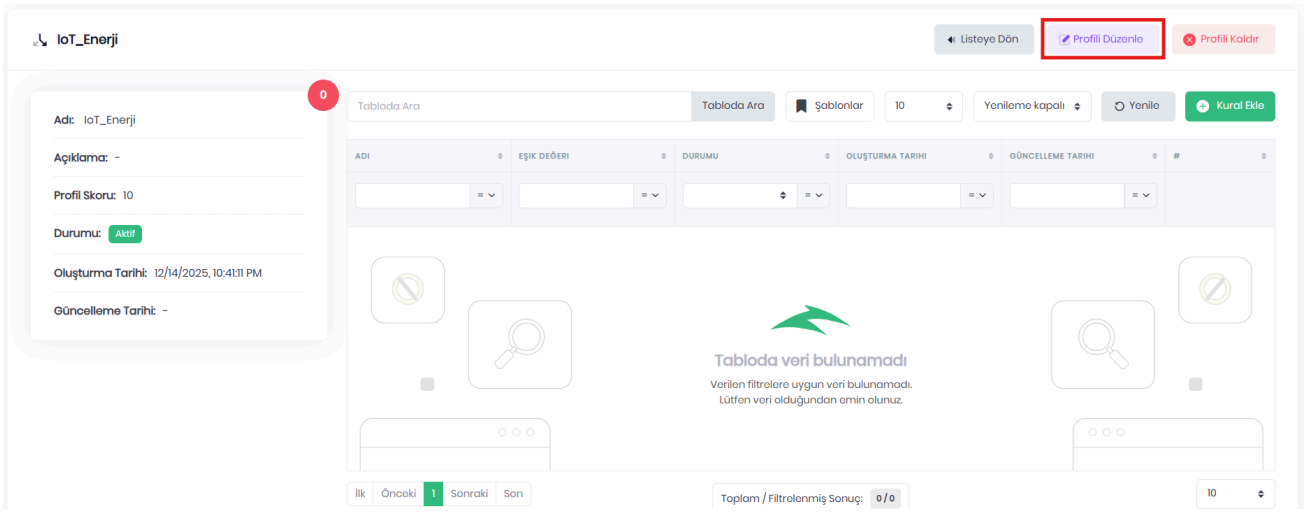
In the window that opens;

You must specify the Name, Description (optional), and Total Threshold Score for the profile you wish to create. Once you create the profile, you will be automatically redirected to the details page.

Important: The Total Threshold Score represents the total score of the rules added to the profile. The score you provide here should be the sum of the scores you give to the rules added to the profile. This section is explained in more detail in "1.6) Profile Score System and Examples".

3. Profile Details Page

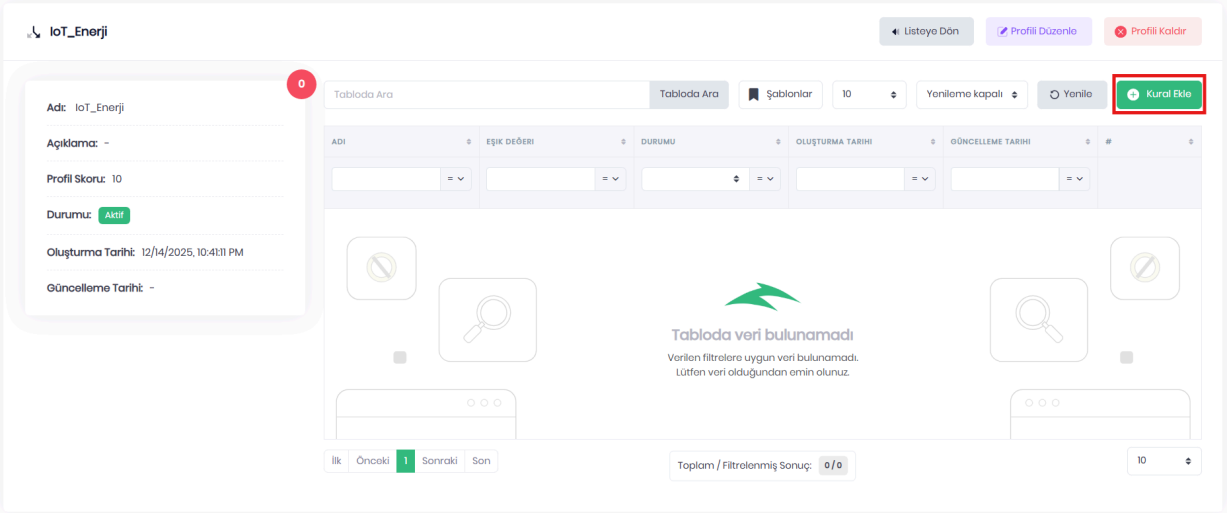
You can edit your profile by using the "Edit Profile" button located in the upper right corner of the profile details page.



On the editing screen, you can change the Profile Name, Description, or Total Threshold Score.

4. Adding a Profile Rule

You can add a new rule by clicking the "Add Rule" button located on the right side of the profile details page;



When adding a rule;

Name: A specific name you can give to the rule.

Score: Points for the relevant rule (affects profile score)

Status: Rule active/passive status.

Rule Type: Profiling class

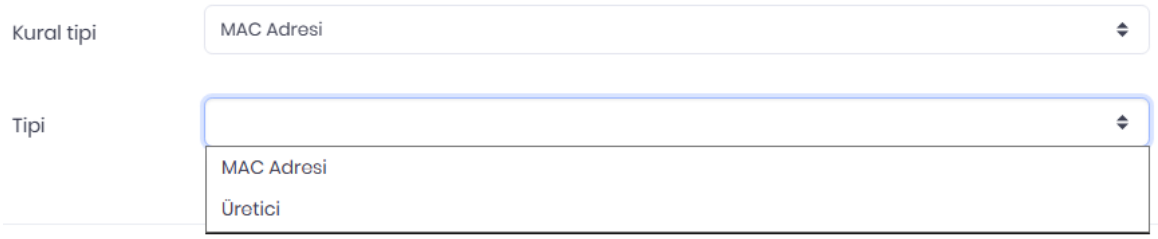
You can create a new rule set by entering the information.

Note: When you select a rule type, extra input fields for that rule type will appear on the relevant screen. These are explained in the Rule Types section.

5. Profile Rule Types

5.1. According to MAC address information

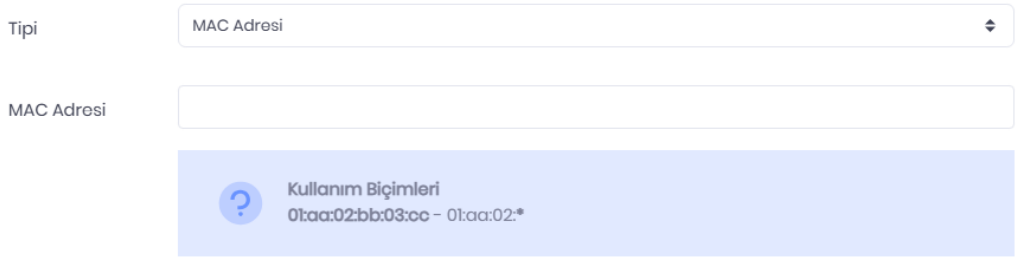
The rule type is " **MAC".** When **"Address** " is selected;



You can create profile rules based on the MAC address itself or the manufacturer information **.**

5.1.1. MAC Address

When MAC address is selected as the rule type;



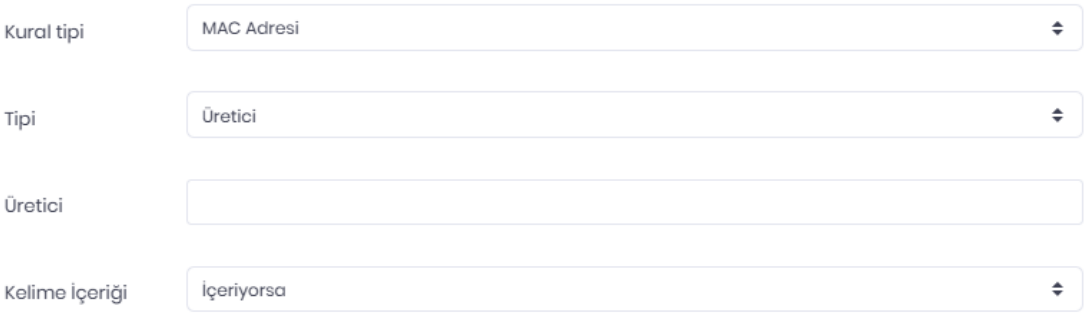
You can create a rule using the full MAC address or if it starts with `:*` regex. For example;

- If the MAC address of the device trying to access the network is 01:aa:02:bb:03:cc
- If the MAC address of the device trying to access the network starts with 01:aa:02:*

You can define the rule in this way.

5.1.2. MAC Manufacturer Information

In MAC manufacturer information type;



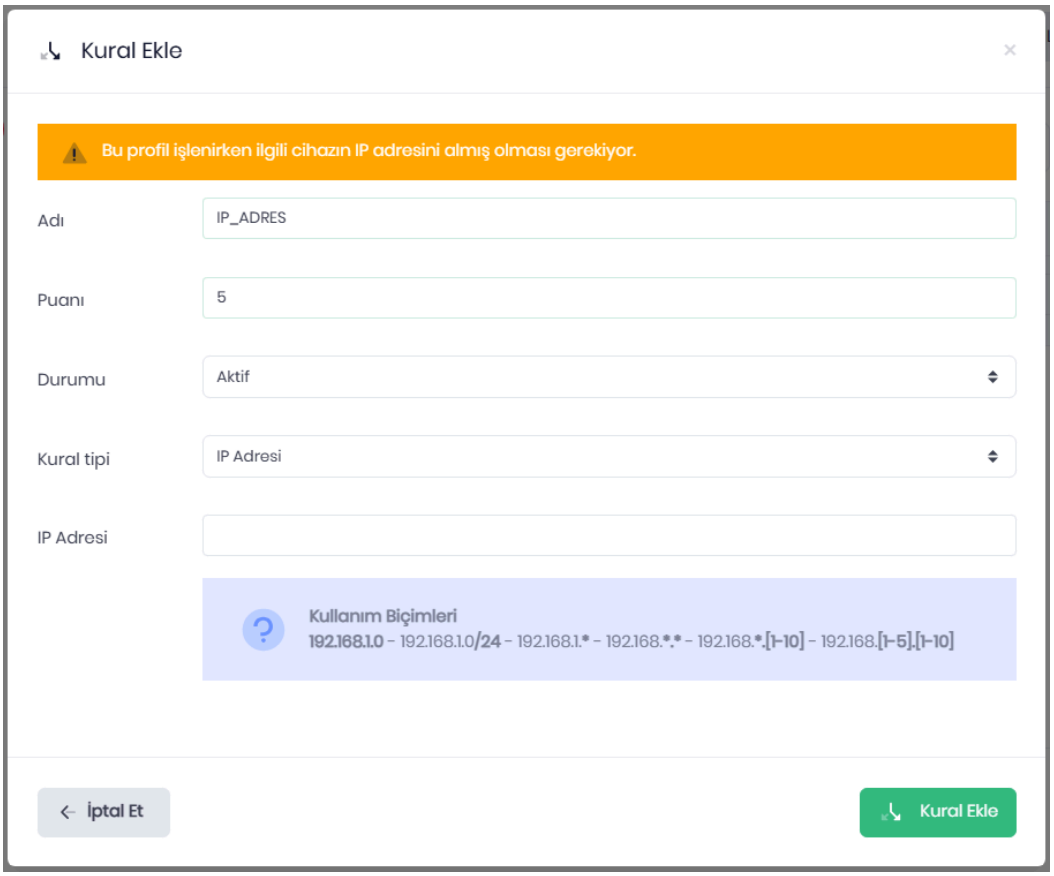
After entering the " **Producer " information, the " Word" you entered will be processed. The content is selected using the sub-rule** " **If Equal to** , **Contains** , **Begins with** , **Ends with ". For example, when " Samsung " is selected** as the manufacturer information and " **Contains** " is selected as the word content;

- the MAC address of the device trying to access the network contains " **Samsung** "

You can define the rule in this way.

5.2. Based on IP Address

The rule type is " **IP".** When " **address** " is selected;



Rules can be defined for devices connecting to the network based on their full IP address, IP block, the last octet of the IP address, the last two octets of the IP address, or IP address ranges. For example;

- If the IP address of the device trying to access the network is 192.168.1.10,
- If the IP address of the device trying to access the network is within the 192.168.1.0/24 IP block,
- If the IP address of the device trying to access the network starts with 192.168.1 and its 4th octet is any digit (maximum 254) (192.168.1.*),
- If the IP address of the device trying to access the network starts with 192.168 and the last 3rd and 4th octets contain any digit (maximum 254) (192.168.*.*),
- If the device trying to access the network gets an IP address that starts with 192.168 and its 3rd octet starts with any number (Maximum 254) and is between [1-10], then (192.168.*.[1-10])

- If the device trying to access the network has an IP address that starts with 192.168 and its 3rd octet is a number between [1-5] and its 4th octet is an IP address between [1-10] (192.168.[1-5].[1-10])

You can define rules in this way.

Note: For a rule to match the IP address type, the device connected to the network must have received an IP address.

5.3. Depending on location

Location " is selected as the rule type ;

5.3.1. Location Information

In terms of location type;

You can define rules by selecting the locations created on FastNAC.

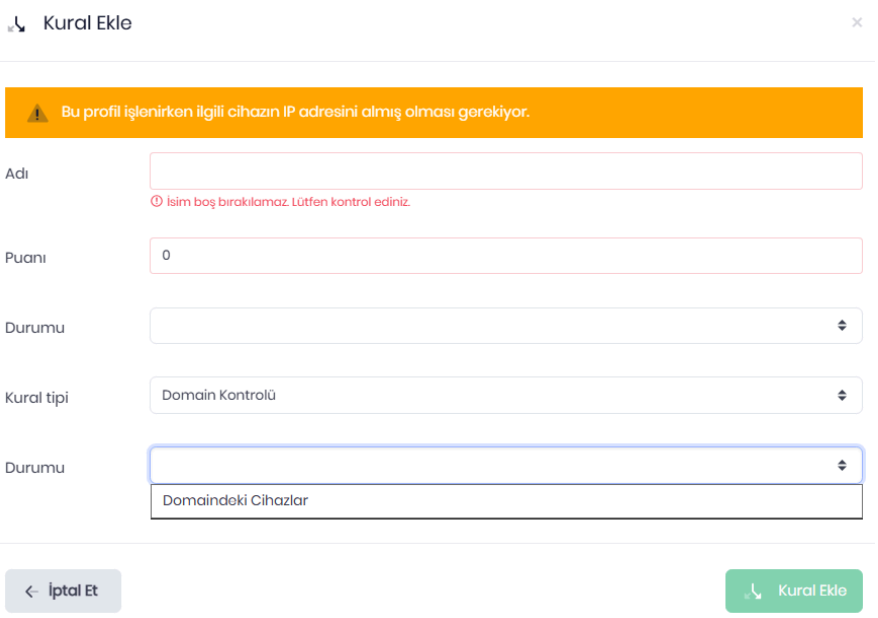
5.3.2. Switch/Port Information

In the Switch/Port Information Type;

You can define rules based on the Switch/Port information written to the inputs.

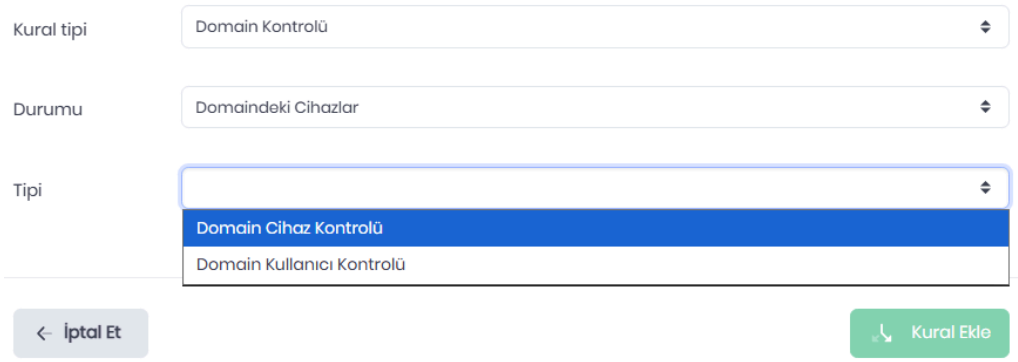
5.4. Domain Control

Domain Control " is selected as the rule type ;



5.4.1. Domain Device Control

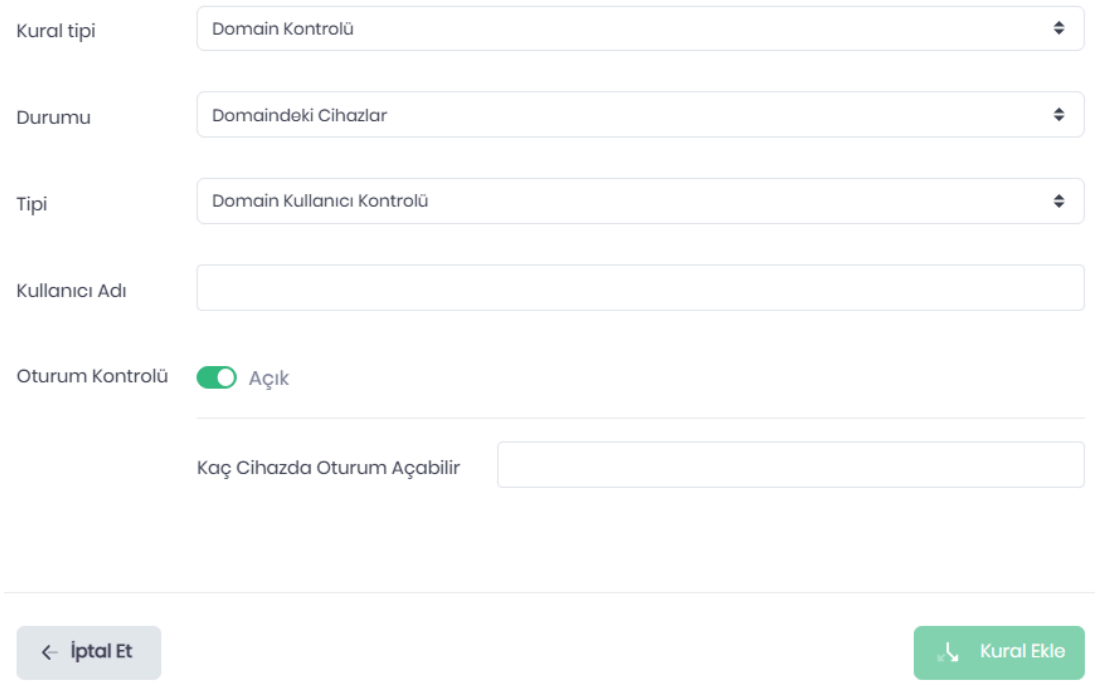
This is the default profile type.



This profile enables domain control of devices according to parameter settings.

5.4.2. Domain User Control

In the Domain User Control type;



You can create custom profiles for users on the domain. You can also control how many devices a user can log in from using the " **Login " option.** You can enable **the "Control** " setting. For example;

- **onur " is logged in** on the device attempting to access the network , and if session control is enabled and a second session is opened on any device (the number 3 must be entered in the input field to comply with the rule definition.)

You can define the rule in this way.

5.5. Active Directory

Active Directory " is selected as the rule type ;

You can define profiles for Active Directory users based on their attributes (custom attributes). The attribute name must match the attribute name in Active Directory. You can define rules based on the corresponding value. For example;

Attribute Name: **department**

Value: **Information Processing**

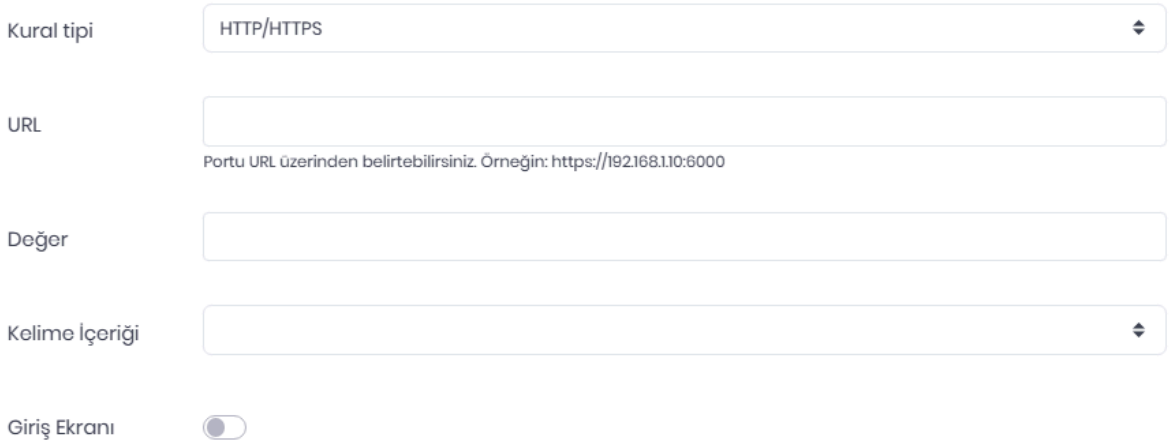
Word Content: **Equal**

- **onur** " is logged in on the device attempting to access the network , and the department attribute of the user " **onur** " is " **Information"** If **the operation** is equal to the text "Operation"

You can define the rule in this way.

5.6. HTTP/HTTPS

HTTP/HTTPS " is selected as the rule type, if the device has a web interface (80/443), you can scan the interface and define a profile based on the words it contains.



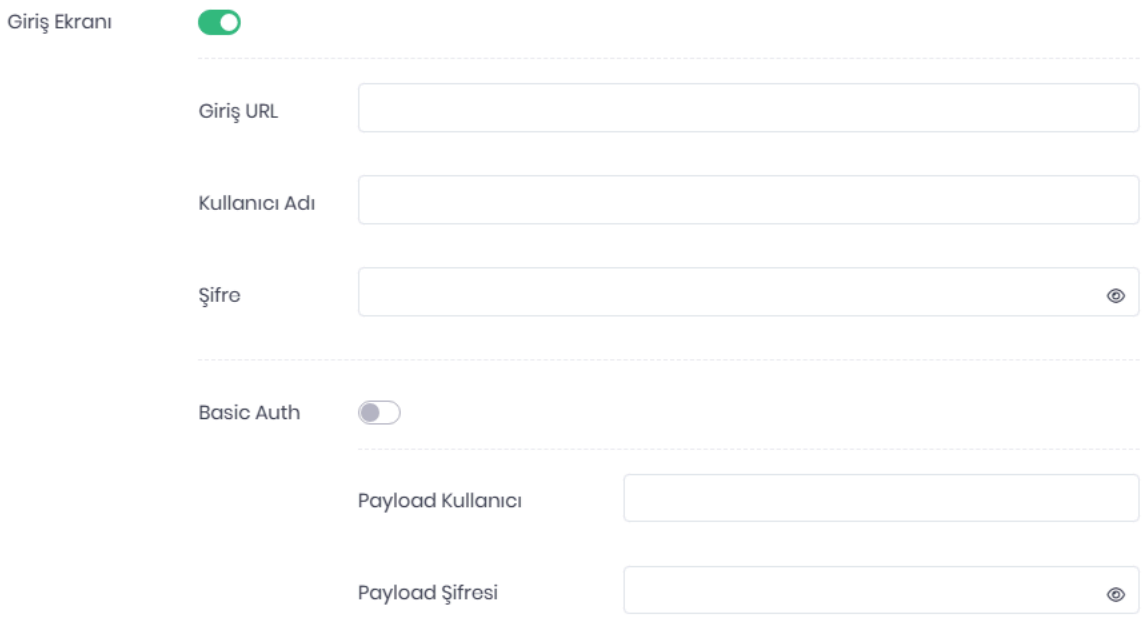
URL: If the device you wish to profile has a specific URL address, you can enter it here. Otherwise, simply enter "/".

Value: After scanning the web interface, the value you wish to search for is entered here.

Word Content: If it is equal to, contains, begins with, or ends with, a sub-rule should be selected.

Login Screen: On/Off

After logging in to the desired web interface with your Username and Password, if you need to continue with the process, you can open the "Login Screen" section and make the following settings;



Login URL: The URL where the user will log in (for example: login.php)

Username: The username that will be used to log in to the page.

Password: The password to log in to the page.

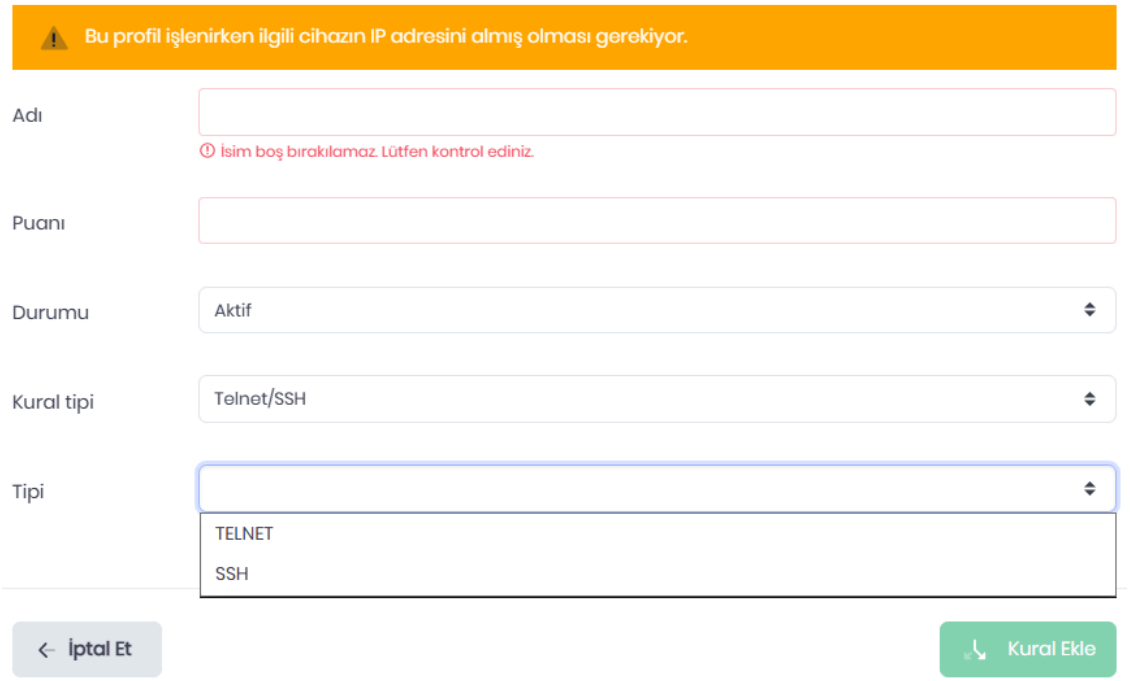
Basic Auth: On/Off

Basic Authentication is one of the simplest authentication methods used in the HTTP protocol. If the web interface you wish to scan uses Basic Authentication, enabling this setting will attempt Basic Authentication using the Username and Password provided on the form.

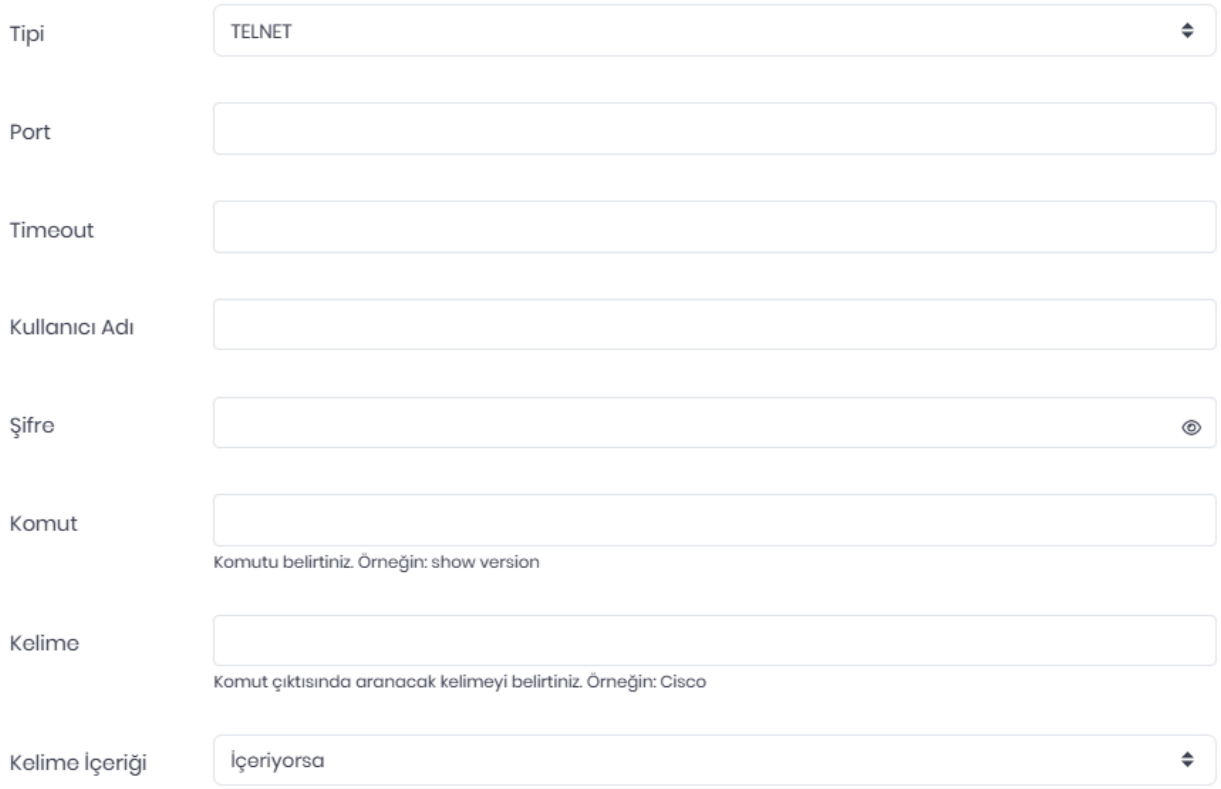
If Basic Authentication is not enabled, the relevant setting is set to Off. The user information for logging in must be entered in the Payload Username and Payload Password sections.

5.7. Telnet/SSH

Telnet/SSH " is selected as the rule type ;



5.7.1. Telnet



Port: Telnet port information (Default port is 23.)

Timeout: Connection timeout period (30 seconds if not specified)

Username: The username required for Telnet connection.

Password: The password required for Telnet connection.

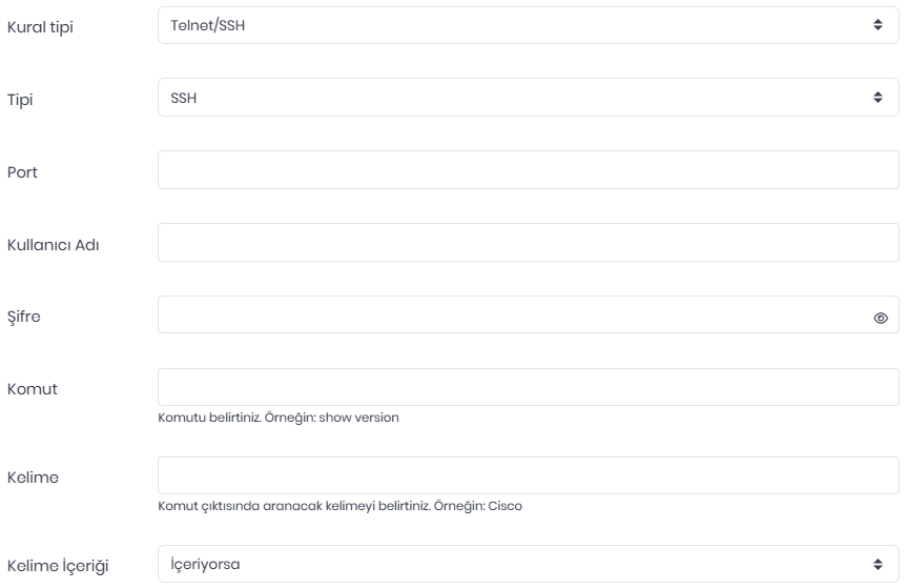
Command: The command to be executed after establishing a Telnet connection.

Word: The output sought after the execution of the command.

Word Content: If it's equal to, contains, starts with, or ends with, then a sub-rule should be selected.

The working principle is as follows: you can access the relevant device via telnet using the given information and write a rule based on the output of the specified command that matches the searched word.

5.7.2. SSH



Port: Telnet port information (Default port is 22)

Timeout: Connection timeout period (30 seconds if not specified)

Username: The username required for Telnet connection.

Password: The password required for Telnet connection.

Command: The command to be executed after establishing a Telnet connection.

Word: The output sought after the executed command.

Word Content: If it equals, contains, starts with, or ends with, then a sub-rule should be selected.

The working principle is as follows: you can access the relevant device via SSH using the given information and write a rule based on the searched word resulting from the output of the specified command.

5.8. DHCP Fingerprint

DHCP Fingerprint " is selected as the rule type ;

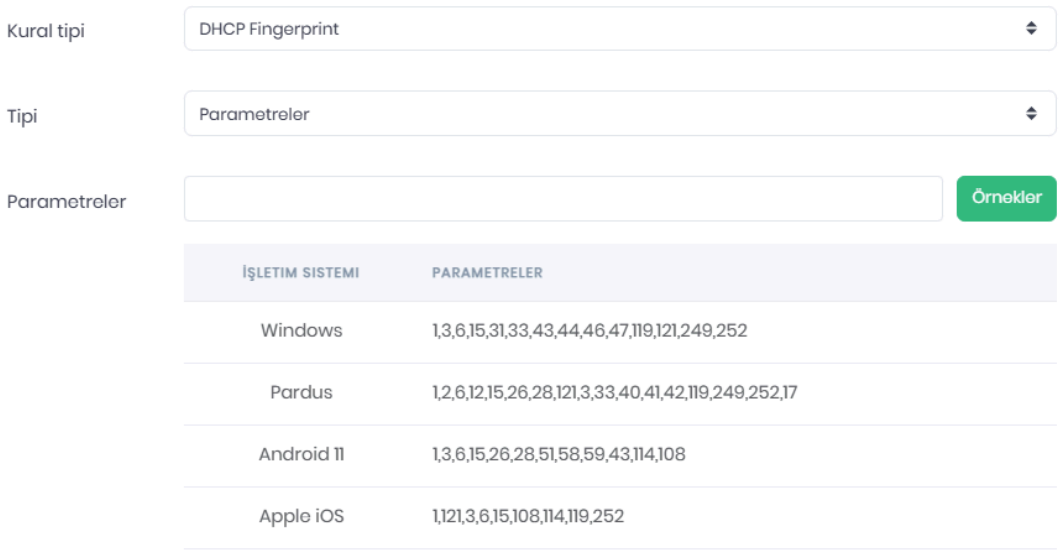
5.8.1. Manufacturer Information

You can define rules based on the manufacturer information in the DHCP Fingerprint output.

5.8.2. Device Name (Hostname)

You can define rules based on the device name (hostname) in the DHCP Fingerprint output.

5.8.3. Parameters



You can define rules based on the parameters in the DHCP Fingerprint output.

5.9. TCP/UDP Port

TCP/UDP Port " is selected as the rule type ;

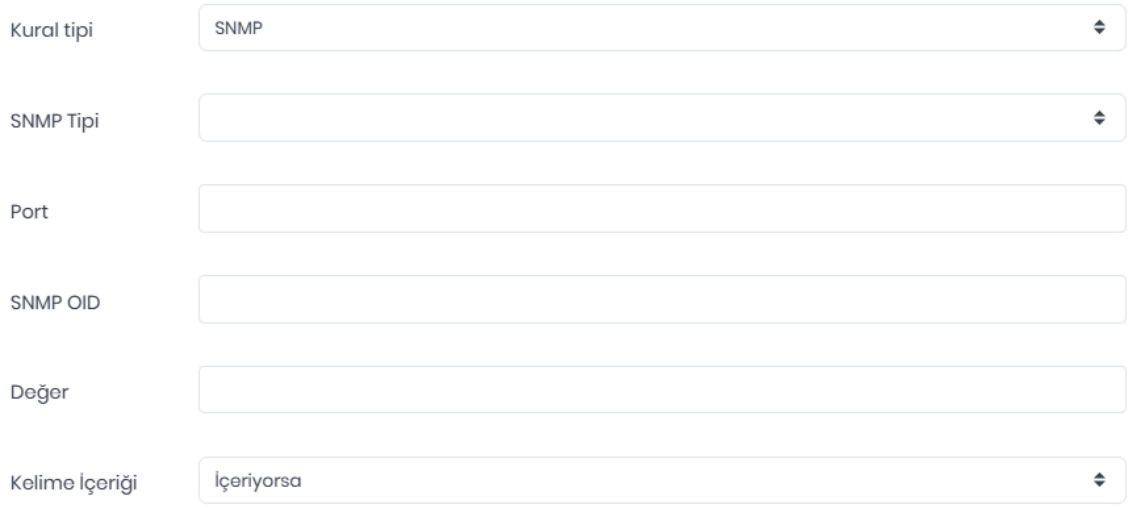
You can define a profile based on the status of the TCP/UDP ports of the relevant device as specified above. Port Statuses:

- Open
- Closed
- Open Filtered

When defining ports, you can use a single port number (e.g., 80), multiple ports separated by commas (e.g., 80,8080), and a range of ports (e.g., 80-8080) to define the rule.

5.10. SNMP

SNMP " is selected as the rule type ;



You can define a profile based on the content of the value received in the output of the specified SNMP OID. It offers support for SNMPv1, SNMPv2c, and SNMPv3. Accepted options for SNMPv3 are:

The supported formats are noAuthNoPriv, authNoPriv, and authPriv.

As for authentication types, it supports No Auth Protocol, MD5, SHA128, SHA256, SHA384, and SHA512.

Priv type support includes: No Priv Protocol, DES, AES 128, AES 192, and AES 256.

For example, based on the entered SNMP information, you can define a rule that responds to a request sent to the OID 1.3.6.1.2.1.1.1 (SNMP sysdesrc OID) if the request contains the word "Cisco".

Note: You can find SNMP OIDs by searching online.

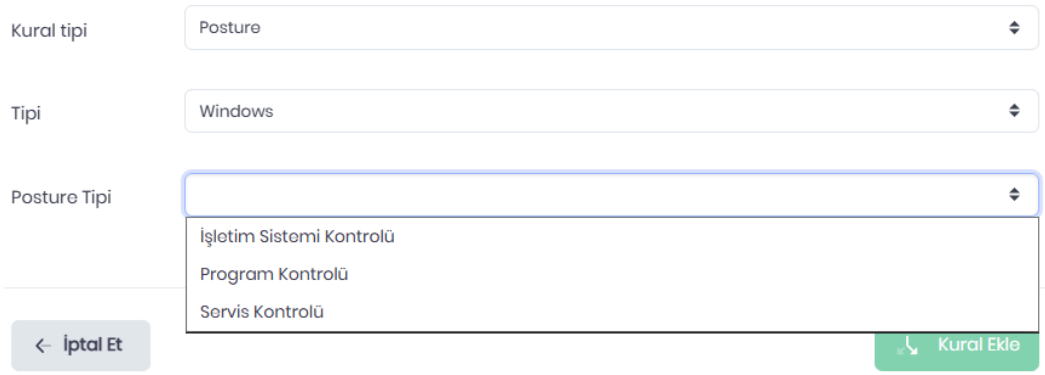
5.11. Posture

Posture " is selected as the rule type ;

You can define rules using features such as Windows, Linux, File Tracking, and Session Tracking.

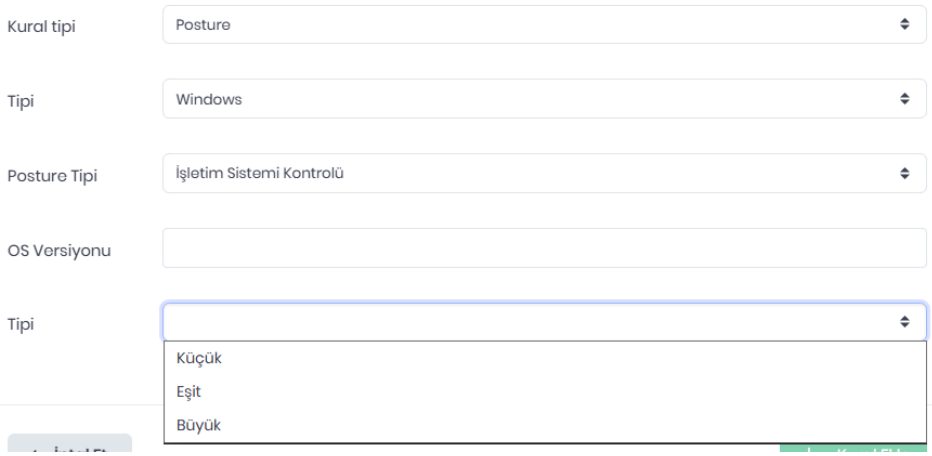
5.11.1. Windows

Windows " is selected as the rule type ;



5.11.1.1. Operating System Control

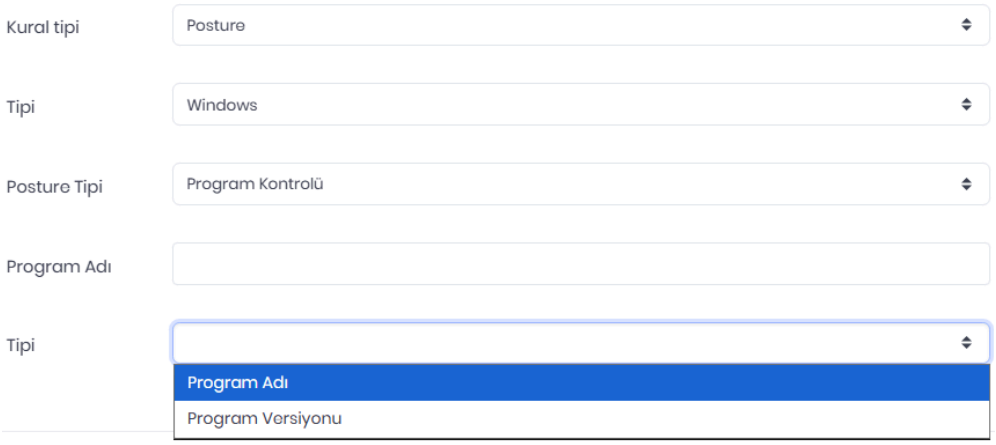
Posture type as " **Operating "** When **"System** Control" is selected;



Operating system version " **OS"** You can define a rule that is " **Less than** , **Equal to** , or **Greater than" the version you enter in the "Version " input field.**

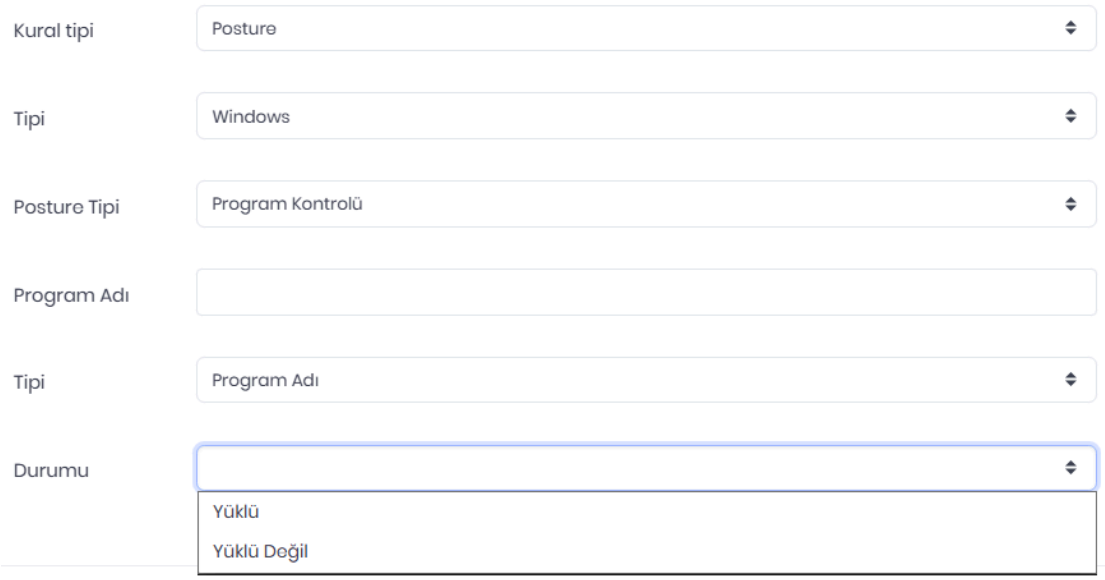
5.11.1.2. Program Control

As a posture type, " **Program "** When **"Control** " is selected;



5.11.1.2.1. Program Name

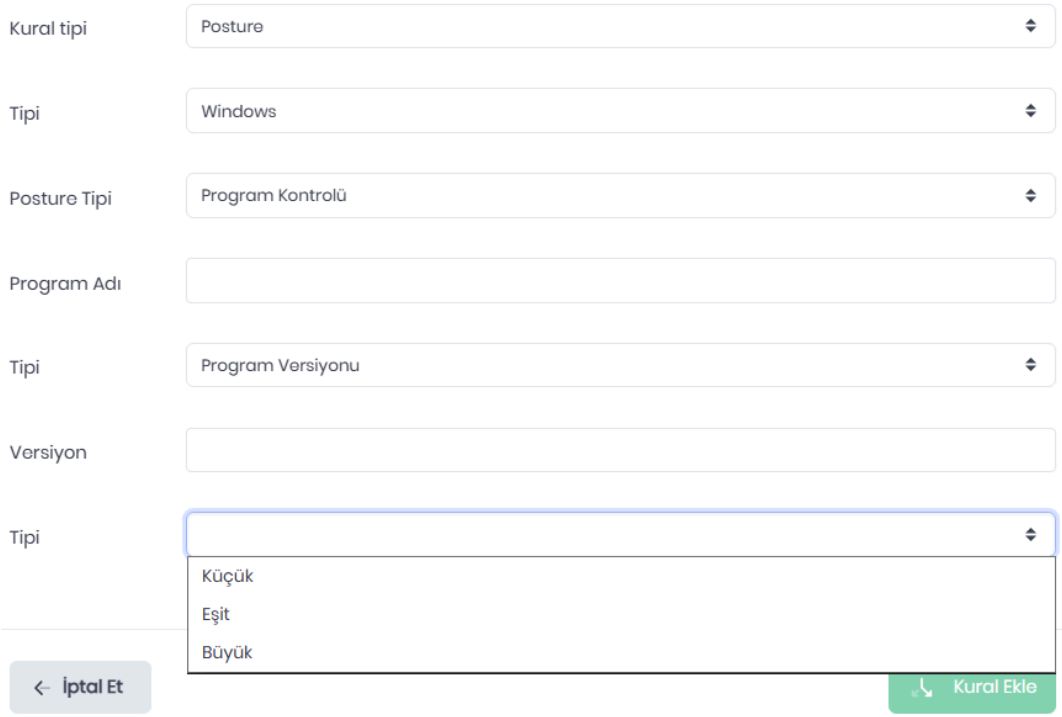
Sub-rule type " **Program "** When **the name** "" is selected;



" **Program"** The program you typed in the **"Name " input field will be marked as " Installed** " or " **Not Installed "** on the controlled device. You can define a rule as " **No ".**

5.11.1.2.2. Program Version

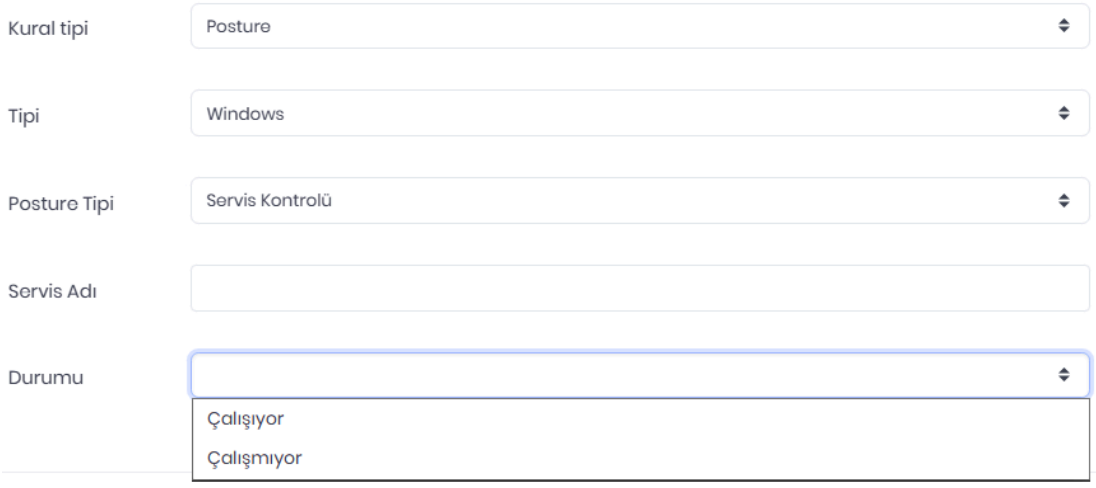
Sub-rule type " **Program "** When **the "Version** " is selected;



" **Program"** You can define rules such as " **Less than** , **Equal to** , **Greater than "** for the program version entered in the " **Version " input, where the name of the program is entered in the " Name " input.**

5.11.1.3. Service Check

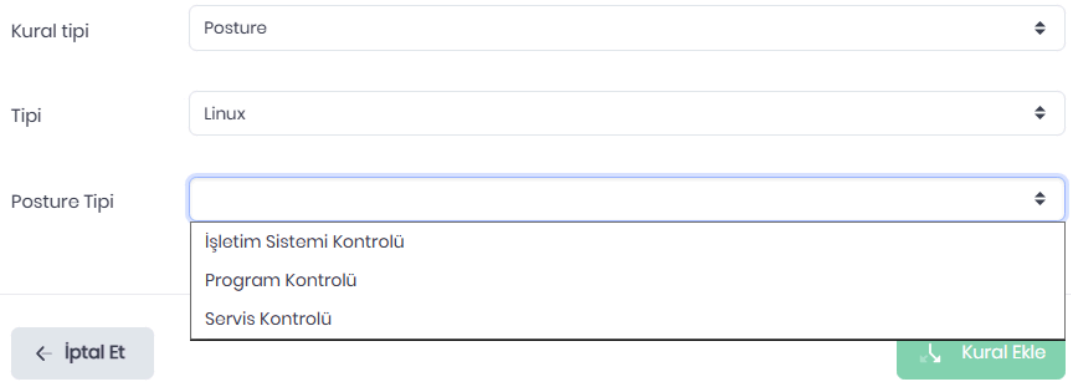
Posture type as " **Serving"** When **"Control** " is selected;



You can define rules based on whether the service you enter in the "Service Name" input field is "Running" or "Not Running".

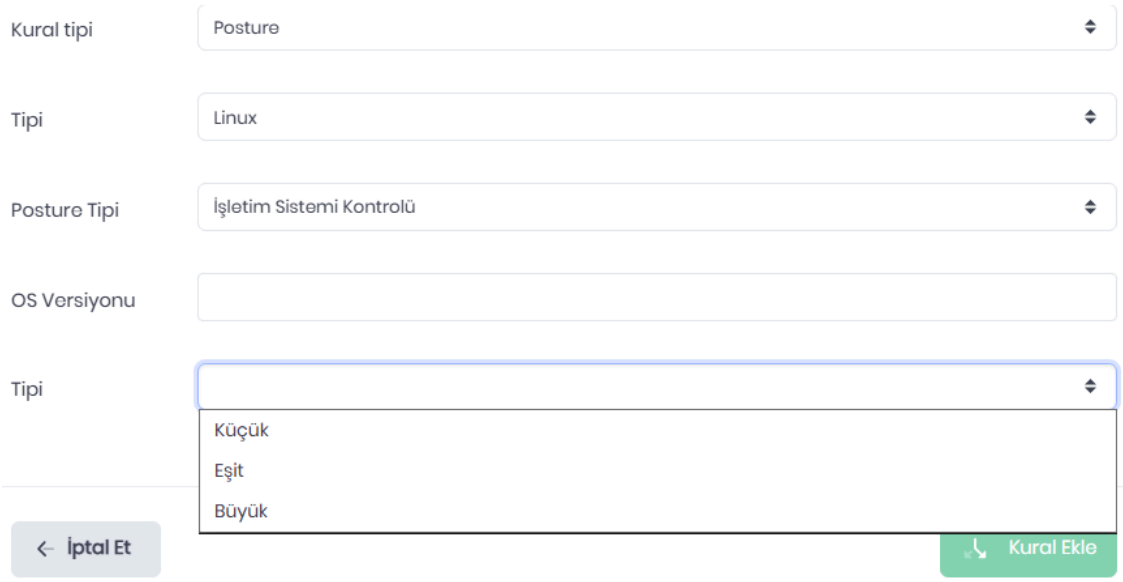
5.11.2. Linux

Linux " is selected as the rule type ;



5.11.2.1. Operating System Control

Posture type as " **Operating** " When **"System** Control" is selected;



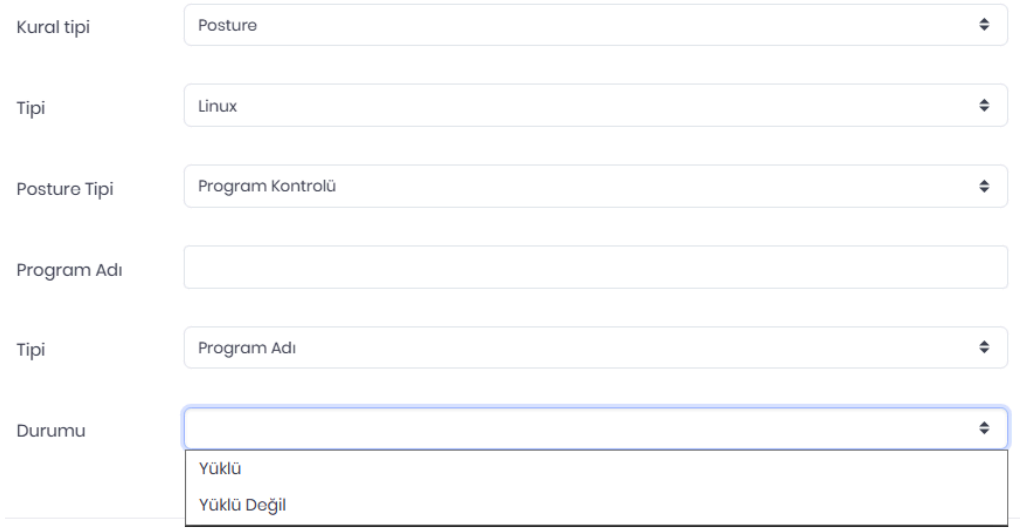
Operating system version " **OS"** You can define a rule that is " **Less than** , **Equal to** , or **Greater than" the version you enter in the "Version " input field.**

5.11.2.2. Program Control

As a posture type, " **Program** " When **"Control** " is selected;

5.11.2.2.1. Program Name

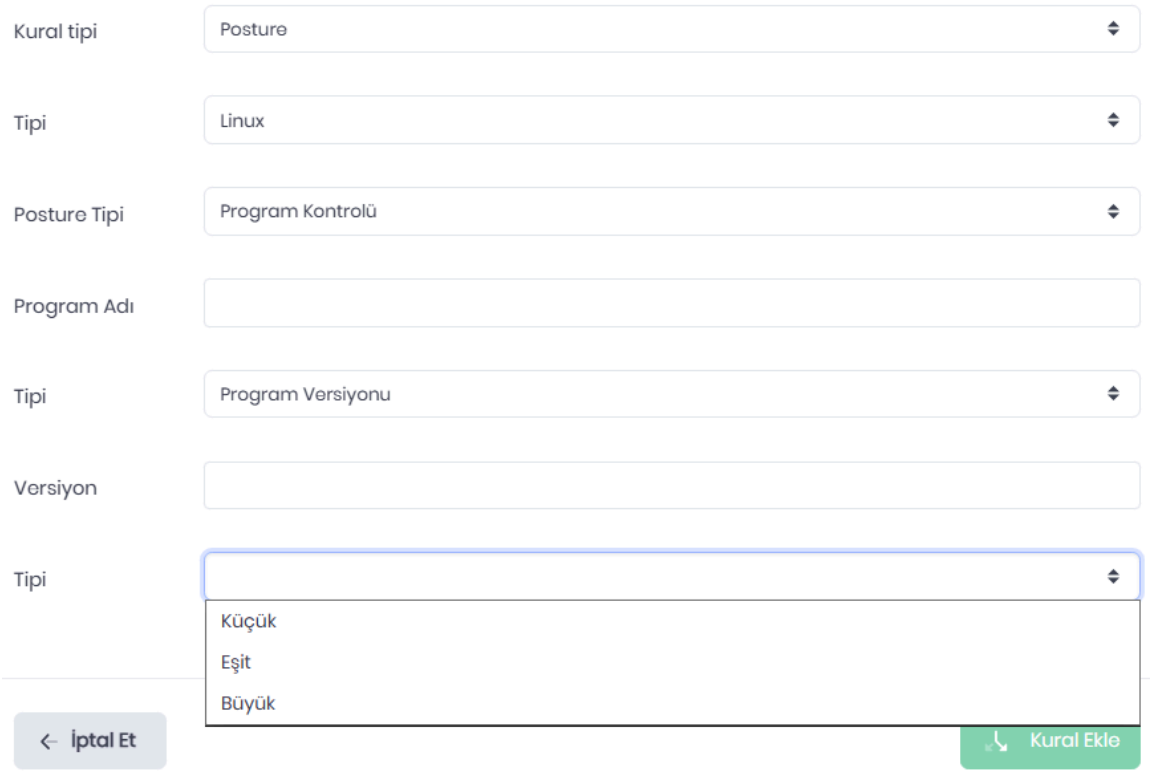
Sub-rule type " **Program "** When **the name** "" is selected;



" **Program"** The program you typed in the **"Name " input field will be marked as " Installed** " or " **Not Installed "** on the controlled device. You can define a rule as " **No ".**

5.11.2.2.2. Program Version

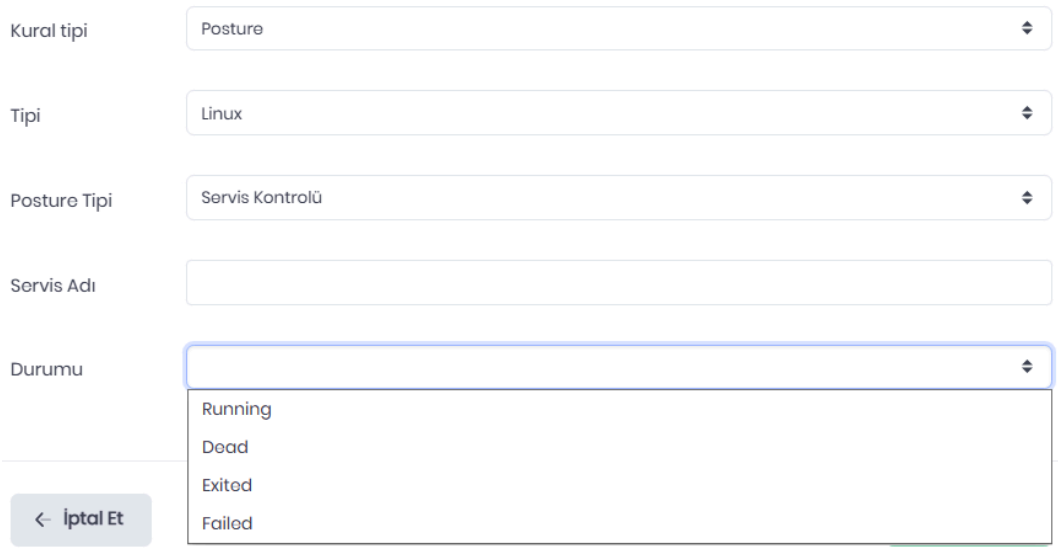
Sub-rule type " **Program "** When **the "Version** " is selected;



" **Program"** You can define rules such as " **Less than** , **Equal to** , **Greater than "** for the program version entered in the " **Version " input, where the name of the program is entered in the " Name " input.**

5.11.2.3. Service Check

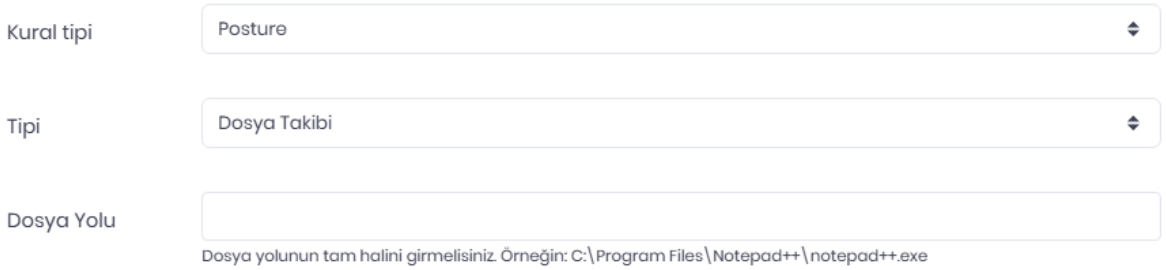
Posture type as " **Serving"** When **"Control** " is selected;



" **Service"** The service you enter in the input field labeled " **Name " will have the** following status: " **Running** ", " Dead **"** , " **Exit " . You can define rules based on** " **Exited** " and " **Failed "** status .

5.11.3. File Tracking

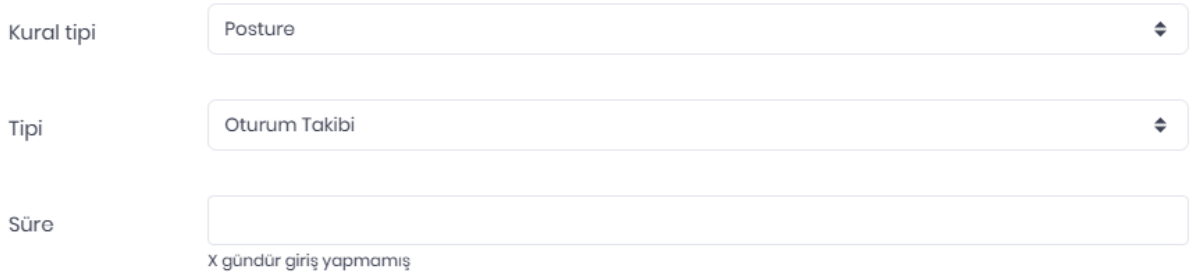
The rule type is " **File ".** When **"Tracking** " is selected;



" **File** You can define a rule to check the device for the existence of the file specified in the " **Path " input.**

5.11.4. Session Tracking

Rule type: " **Session "** When **"Tracking** " is selected;



You can define a rule on the device to prevent login based on the number of days specified in the " **Duration " input.**

5.12. NMAP

NMAP " is selected as the rule type ;

starts a scan using the NMAP parameters entered in the " **Parameters " section and** searches for the output entered in the " **Word " input. For example, I entered " -Pn -O** " in the Parameters input and " **Windows** " in the Word input;

- Start an NMAP scan on the device with the specified parameters, and if the output shows " **Windows "...**

You can define the rule in this way.

6. Profile and Score System and Examples

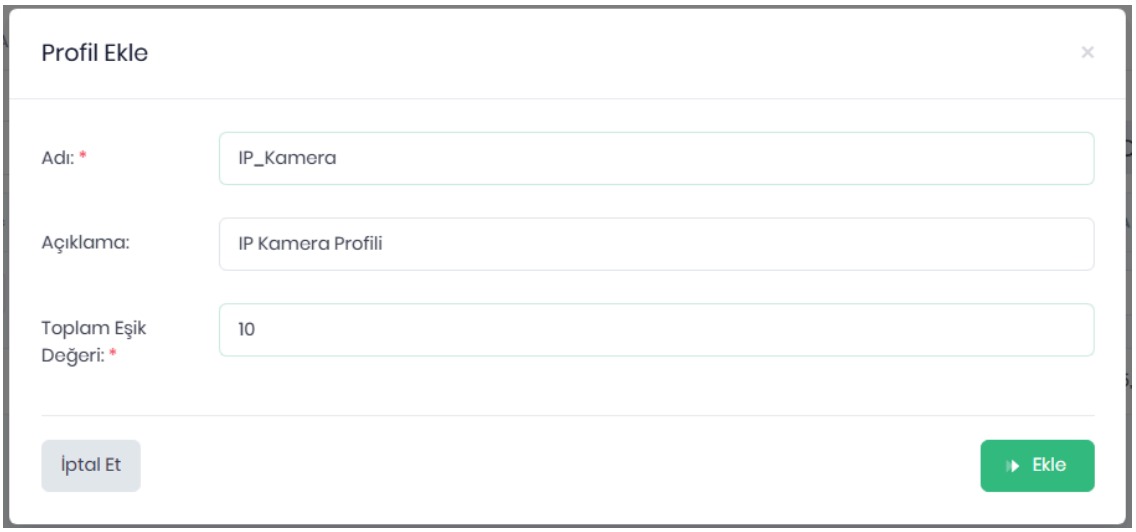
When a new profile is created, you are asked for a Total Threshold Value (Profile Score);

This Profile Score should be set to equal or greater than the total points of the profile rules added to the profile details. The details of the example rules given below are explained in detail under the heading " **1.5 Profile Rule Types ".**

6.1. Example IP_Camera Profile

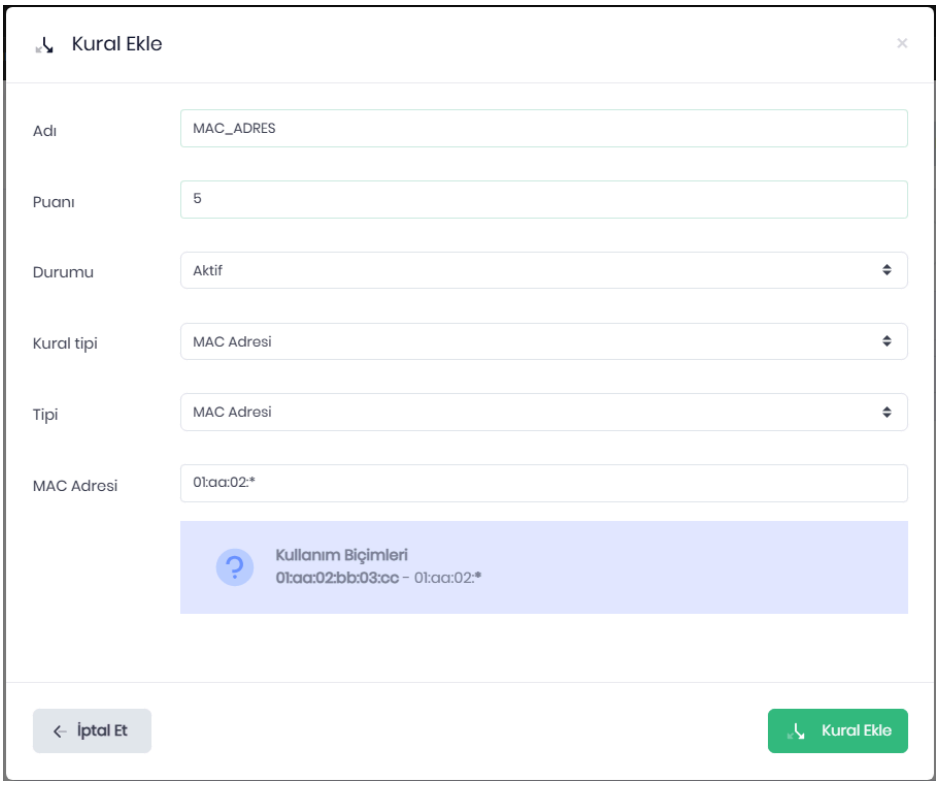
To understand the Profile Score system in more detail, let's create a profile.

" **IP_Camera** " and setting its Total Threshold score to **10** ;



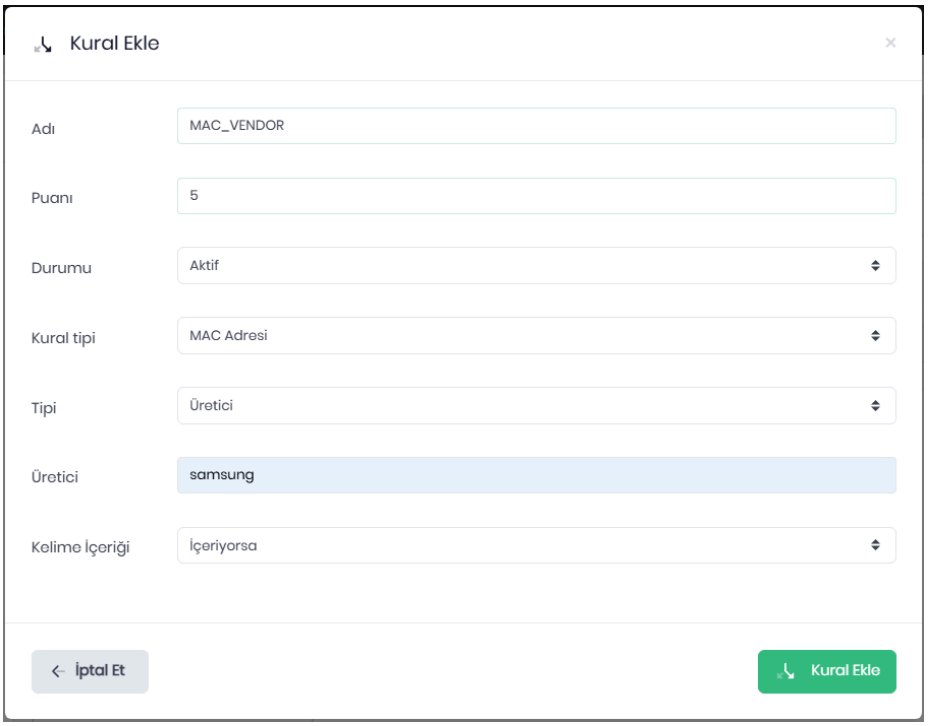
Now we need to add rule sets to the profile we've created in order to reach the Total Threshold Value score.

As a first rule, let's create a MAC address rule set using regex;



According to the example above, if the device's MAC address starts with " **01:aa:02:*** ", it will be interpreted as receiving 5 points from this rule set.

Next, let's create another set of rules and this time choose the Producer;



According to the example above, if the device's MAC manufacturer information contains " **Samsung** ," it will be interpreted as receiving an additional 5 points from this rule set.

" **IP_Camera** " profile to **10.** If a device matches the two rule sets we wrote above, we can now say that the device complies with the " **IP_Camera** " profile. To explain further;

The device trying to access the network;

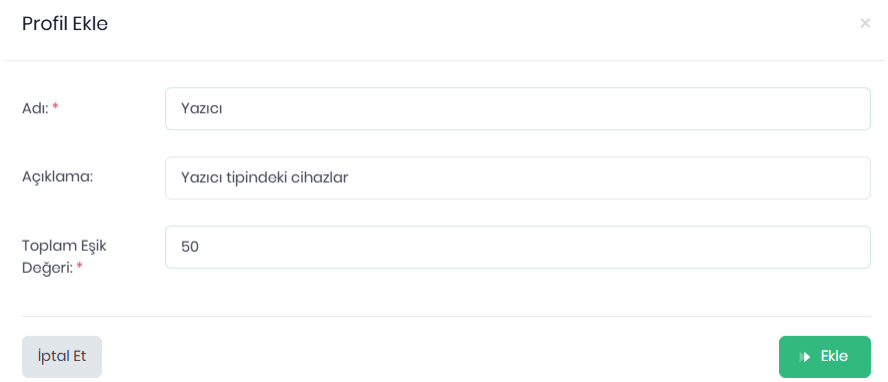
- 5 points if the MAC address starts with " **01:aa:02:* ",**
- MACs will receive 5 extra points if their manufacturer information includes " **Samsung ".**

So, in total, it will have **10** points from the rule sets and will be a device that matches the " **IP_Camera " profile.**

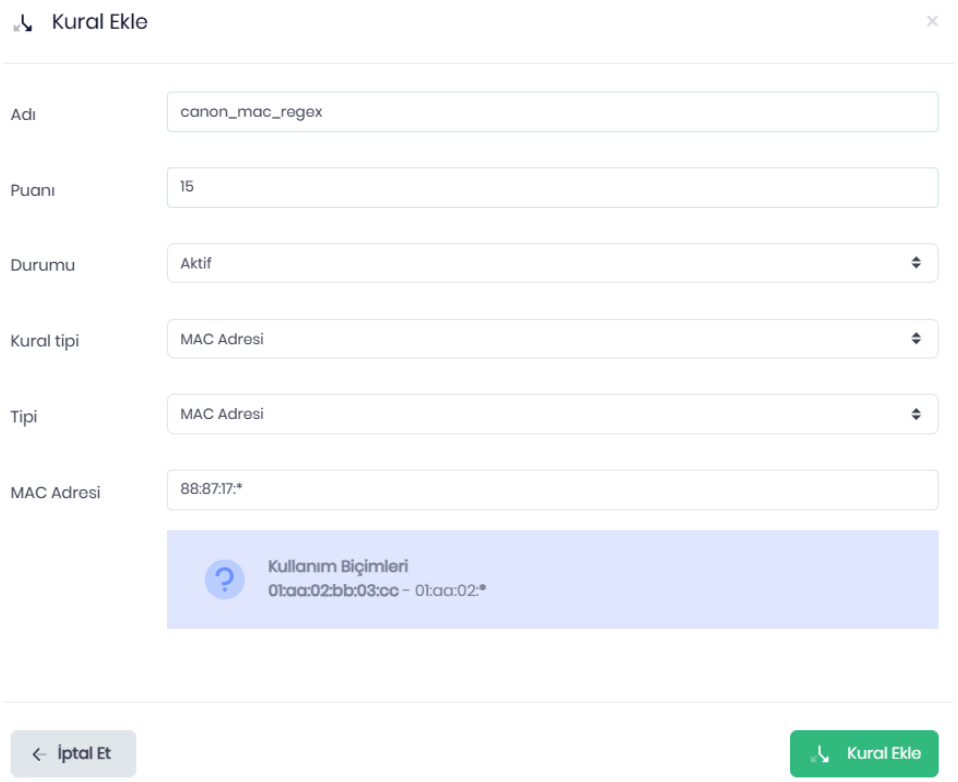
6.2. Sample Printer Profile

Let's create another example, this time a printer profile.

" **Printer** " and setting the Total Threshold score to **50 this time** ;



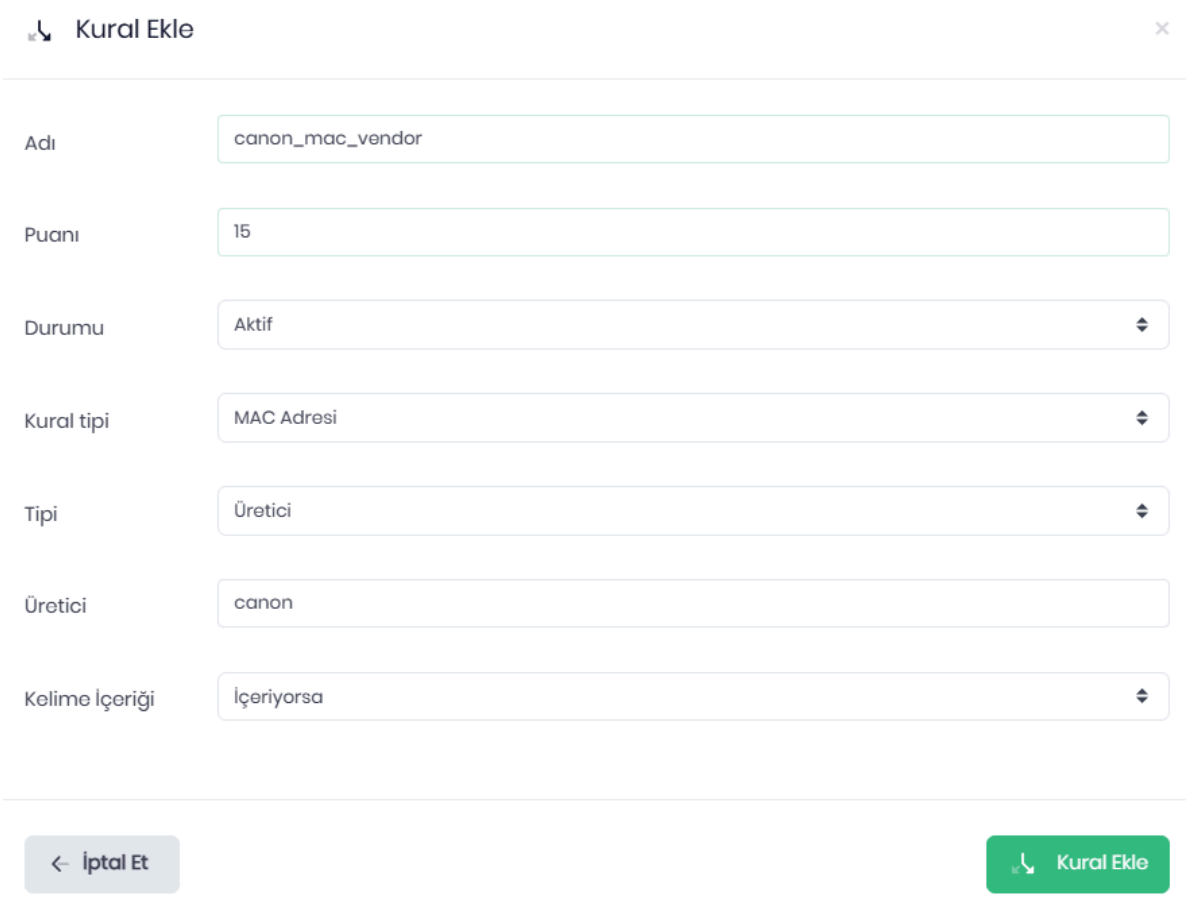
As a first rule, let's create a MAC address rule set using regex;



If the device's MAC address starts with " **88:87:17:* ", we can interpret this as it receiving 15** points from the rule set.

the Profile Score as **50. If our rule applies, the device will receive 15** points, and to classify the device as a **"Printer " profile device, we need an additional set of rules worth 50-15=35** points.

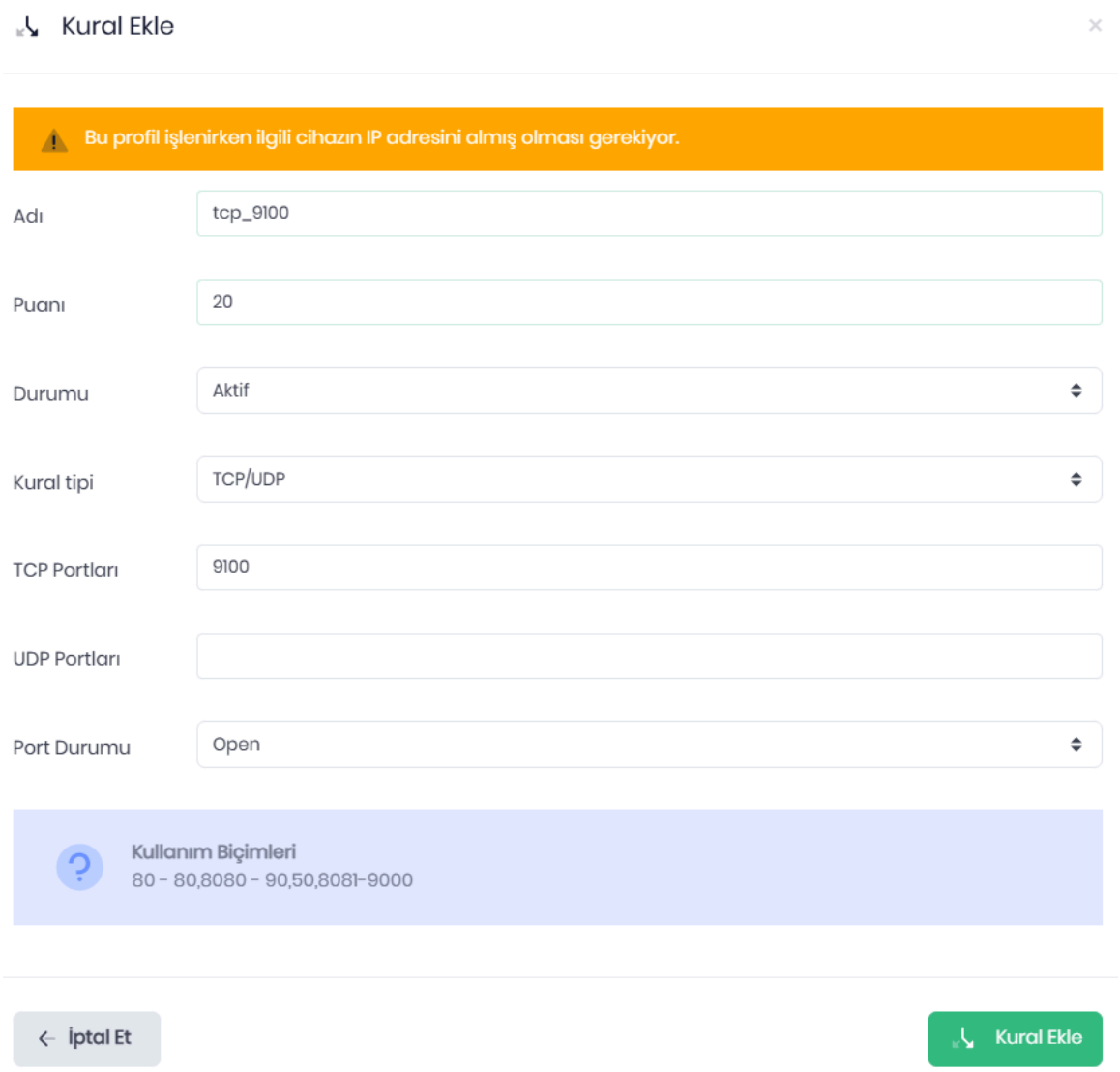
As a second rule, let's add the MAC manufacturer information;



If the device's MAC manufacturer includes " **canon** ," we can interpret this as it receiving 15 points from the rule set.

To reiterate, we specified the Profile Score as **50.** If our first rule works, the device will receive **15** points. If our second rule works, it will receive another **15** points, bringing the total to **30 points. We** need **50 points, and therefore, we require an additional 20 points from the rule sets (50 - 30 = 20** points).

Let's continue and add TCP/UDP port information as the third rule;



We can interpret this as the device receiving **20 points from** the " **TCP 9100 port is open** " rule set .

In conclusion, the device attempting to access the network;

- 15 points if the MAC address starts with " **88:87:17:* ",**
- the MAC manufacturer information includes " **Canon** ," it will receive 15 points.
- " **TCP port 9100 is open,** " you will receive 20 points.

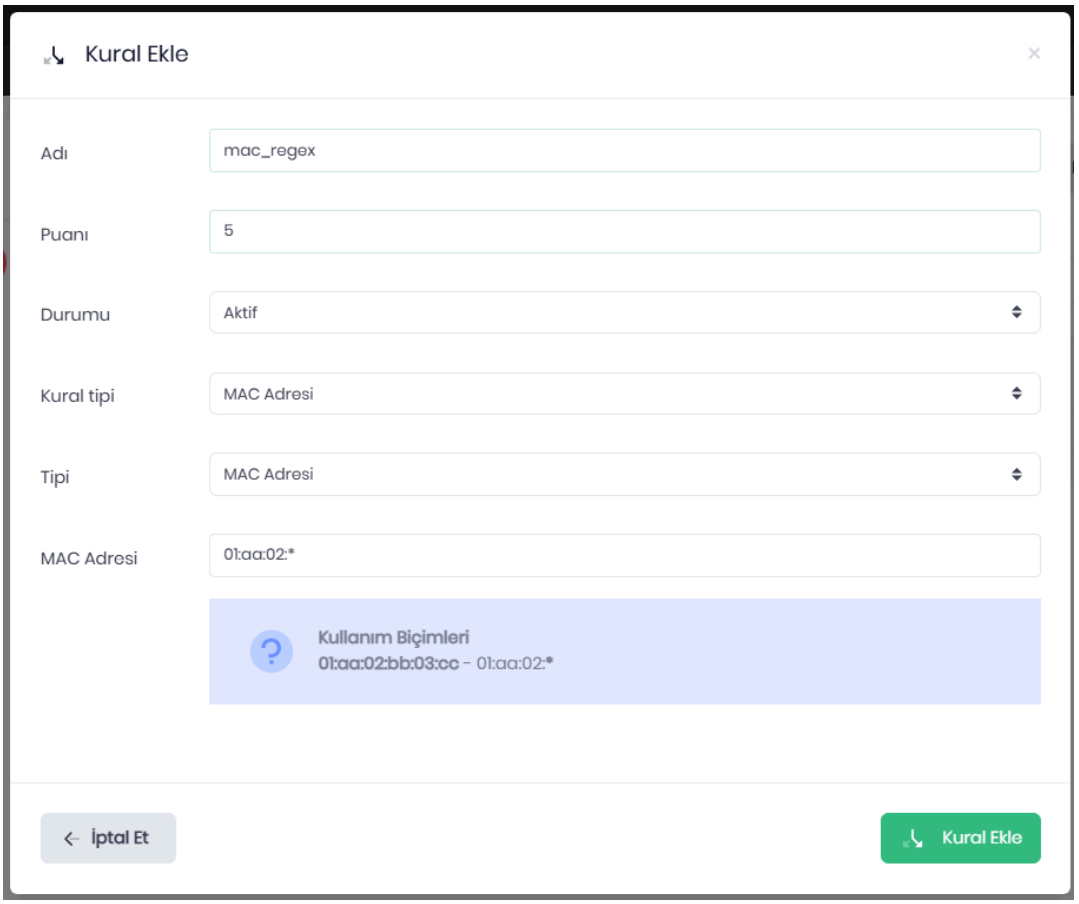
a total of **50** points and will be identified as a device that meets the Printer profile.

6.3. Sample IoT Device Profile

Let's create another example, this time making the profile more comprehensive and rigorous.

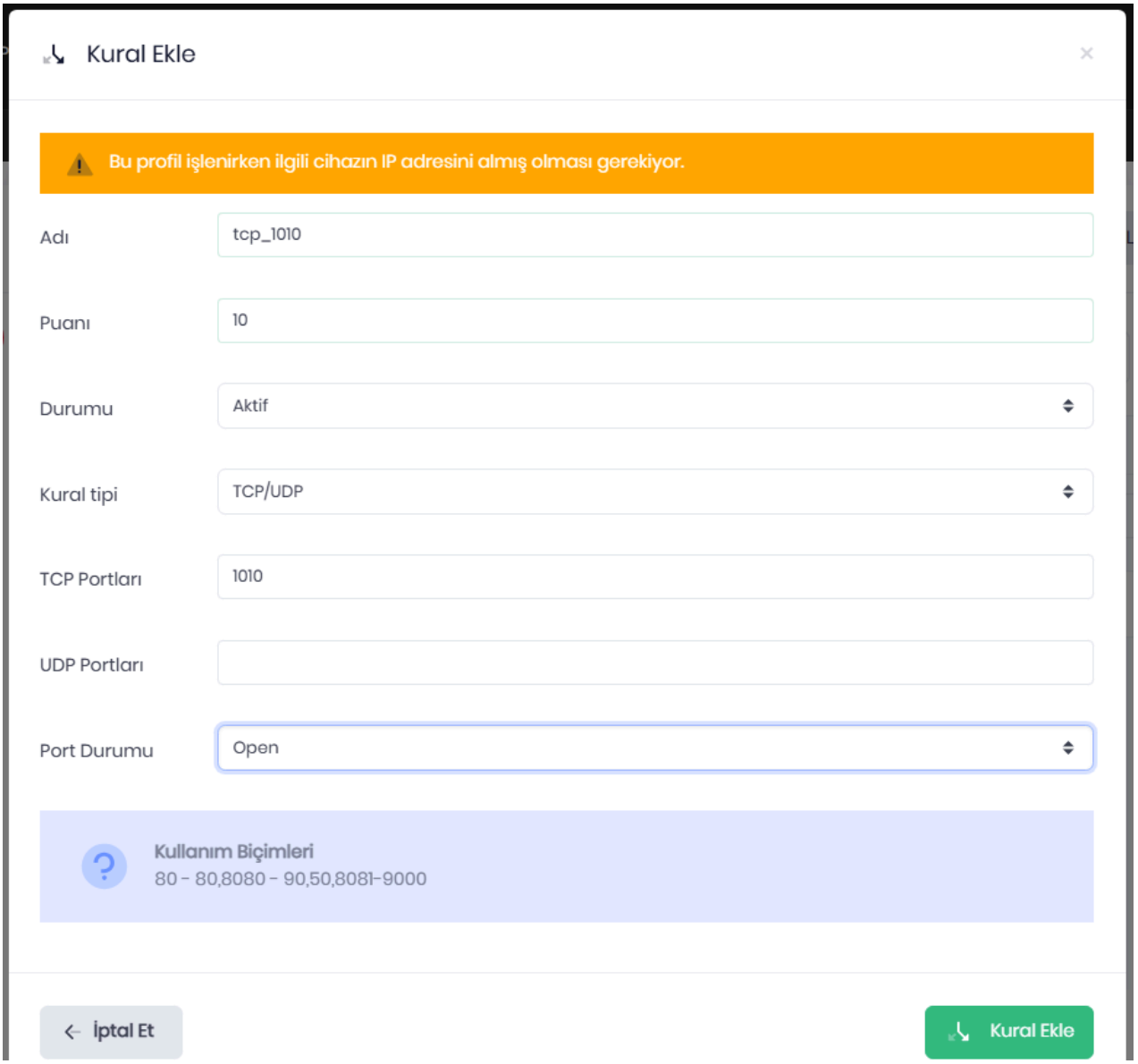
" **IoT** " and setting the Total Threshold score to **50 this time** ;

As a first rule, let's create another MAC address rule set using regex and assign it 5 points;



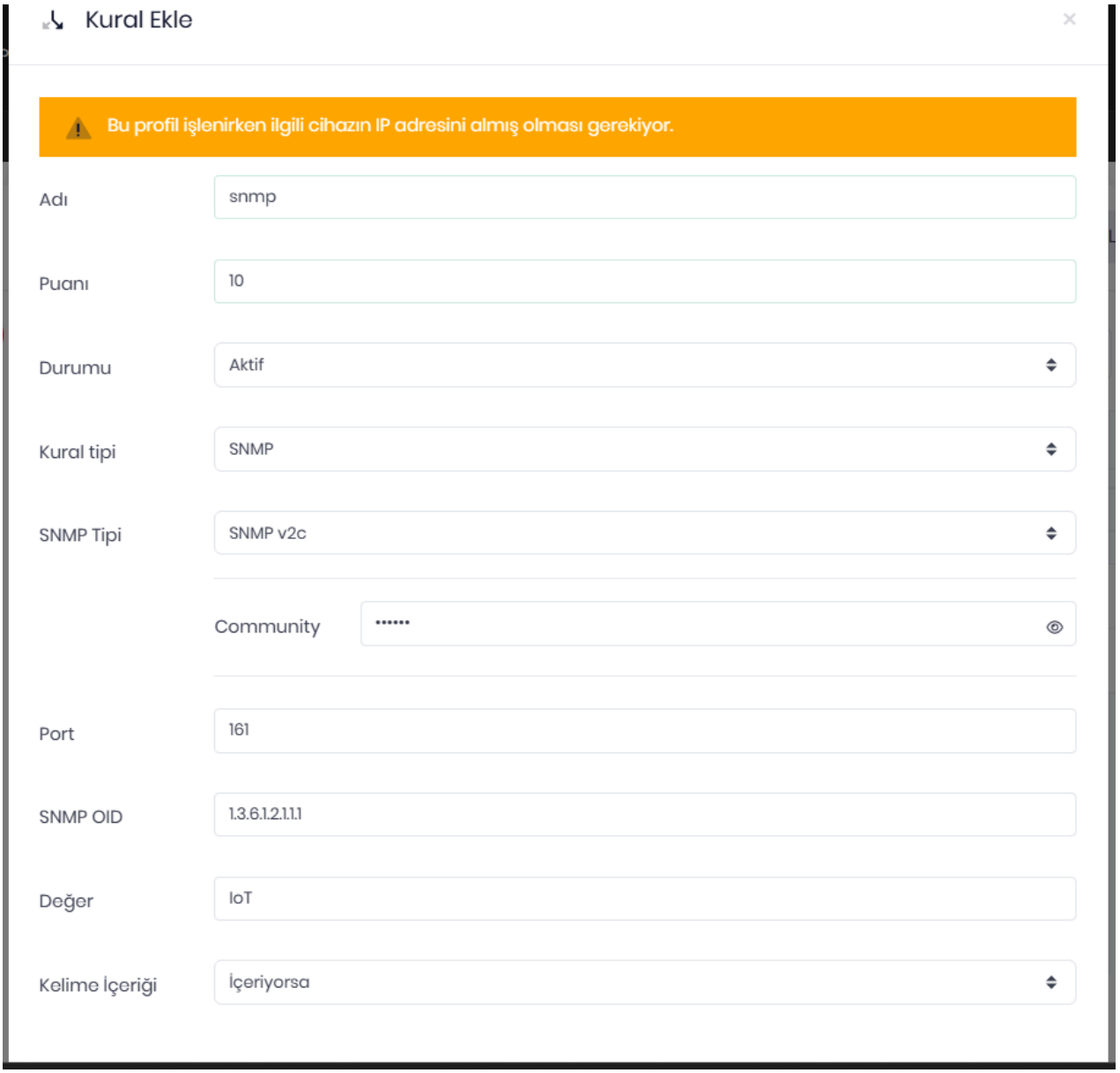
will receive 5 points if its MAC address starts with " **01:aa:02:* "**.

Let's continue and add a second rule: this time, **the TCP port 1010** must be open, and we'll give that 10 points.



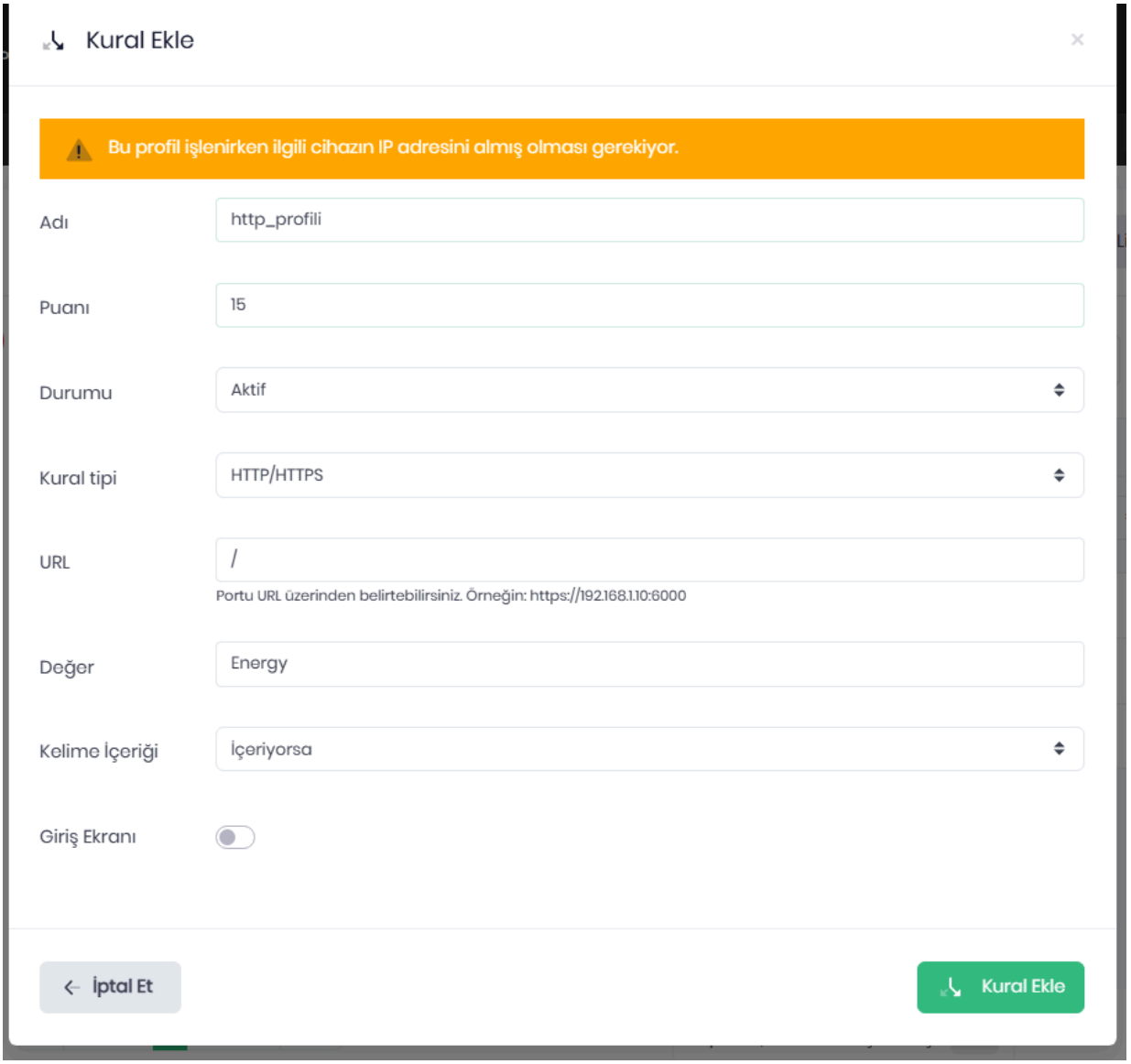
If the device has TCP port **1010 open, it will receive 10** points, bringing its total to **15** points.

As a third rule, let's create an SNMP rule and give it **10** points;



to the device using **the SNMPv2c** community with the code **1.3.6.1.2.1.1.1** (SNMP sysdescr OID), and if the response includes **"IoT" , it will receive 10** points. This will bring the total to **25** points.

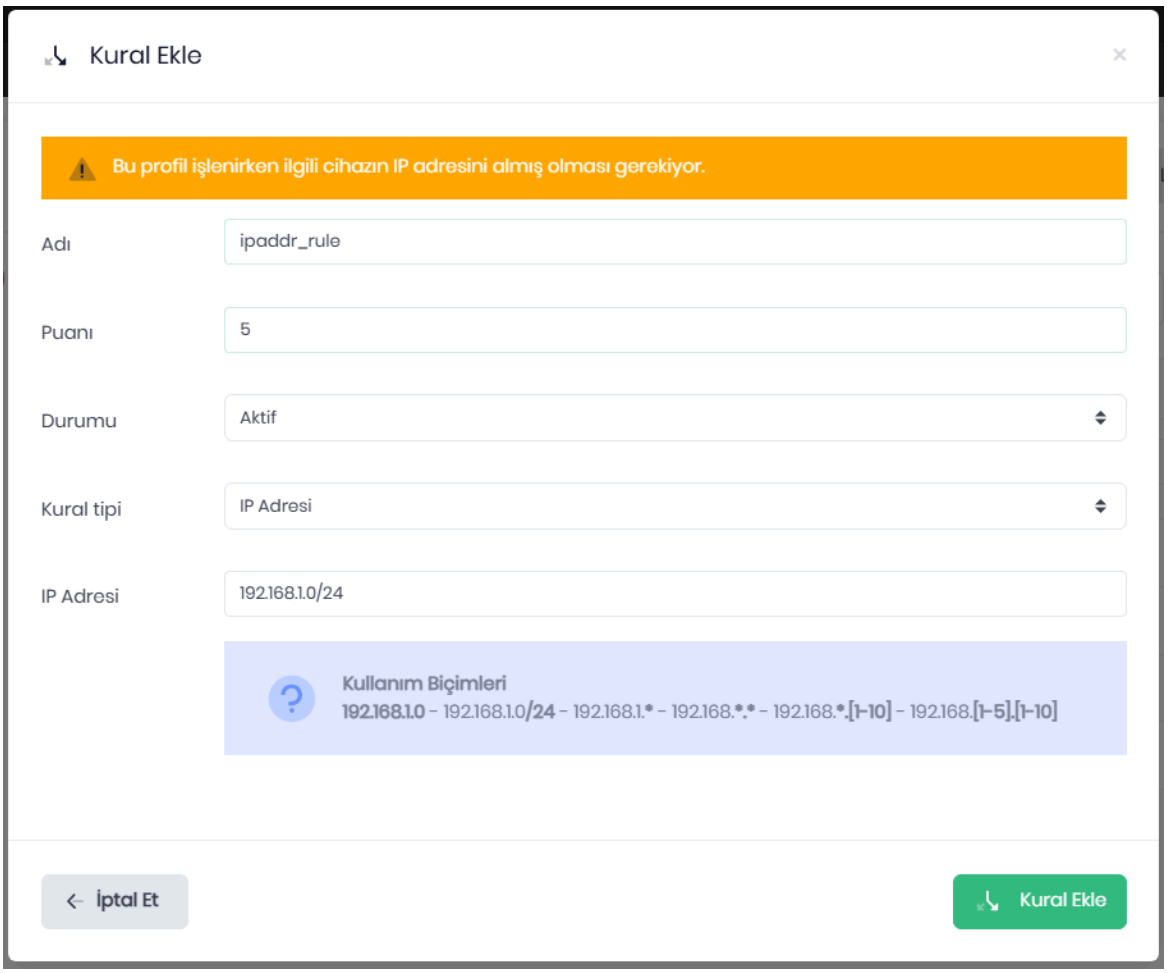
Remember, we gave **50** points when adding the profile. We're currently at **25** points. Let's continue and add the fourth rule as HTTP/HTTPS and give it **15** points;



The device's web interface will be scanned, and if the word " **Energy " appears in its content, it will receive another 15** points for that rule . We've reached a total of **45** points.

To classify the device as having an IoT profile, we needed a 5-point rule set.

Let's add our fifth rule. Let's define its type as IP address and make it a rule that the device must be within an IP block;



the device's IP address is within the **192.168.1.0/24 network block, it will receive an additional 5** points from this rule . The total will be **50** .

Now all our rules are ready. We've created a strict set of rules for us to be able to categorize a device as having an " **IoT** " profile. In summary;

- the device's MAC address starts with " **01:aa:02:*** " , you will receive **5** points.
- the device's " **TCP 1010 port** " is open, you will receive **10** points.
- When we send a request to the device's **SNMPv2c** community with the SNMP OID " **1.3.6.1.2.1.1.1 (sysDescr)", if the response contains " IoT** ", we get **10** points.
- The device's web interface will be scanned, and if the word " **Energy** " appears in its content, **15** points will be awarded.
- **5** points if its IP address is within the " **192.168.1.0/24** " network block.

a total of **50** points, and we will then define this device as one that meets the " **IoT " profile.**

We've learned all the details about device profiling. Once devices are profiled, actions are taken through Policies. You can review the **policies.docx** document for this.