

# Cloudpath Enrollment System Quick Start Guide, 5.5

Supporting Cloudpath Software Release 5.5

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# Cloudpath Security and Management Platform

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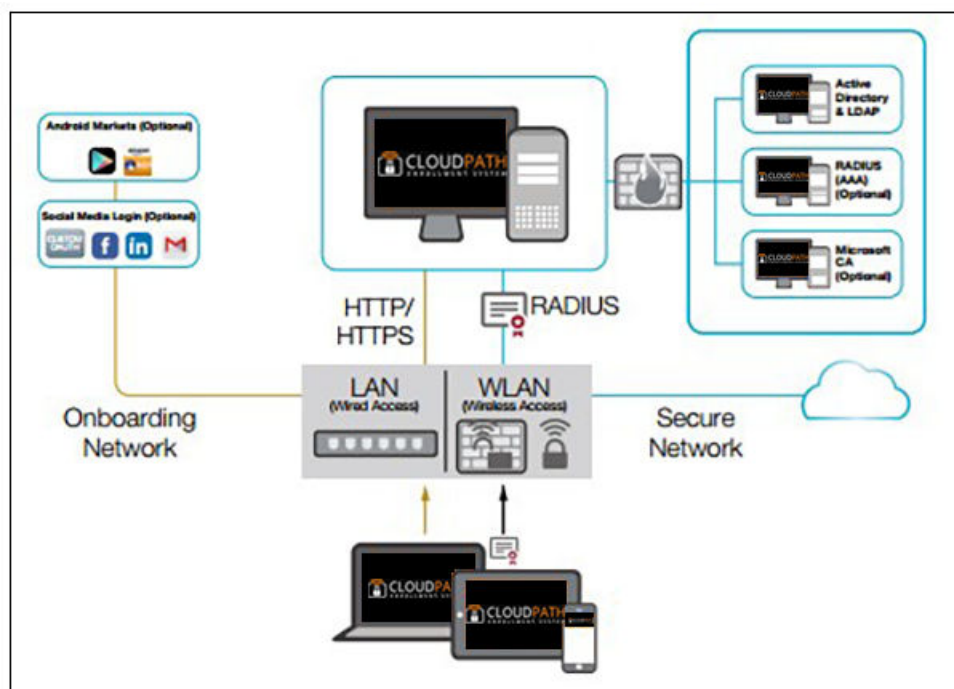
## Overview

Cloudpath Enrollment System (ES) software is a security and policy management platform that enables any IT organization to protect the network by easily and definitively securing users and their wired and wireless devices—while freeing those users and IT itself from the tyranny of passwords.

Available cloud-managed or as a virtual instance and priced per user, Cloudpath software lets IT do with one system what usually requires many, while easily and automatically integrating with existing access and network security infrastructure.

Cloudpath software consolidates and simplifies the deployment of multiple services that are typically disparate and complex to manage: Certificate Management, Policy Management and Device Enablement.

**FIGURE 1** Cloudpath Security and Policy Management Platform



Authorization can come from a variety of sources, including authentication using vouchers or acceptance of a use policy. Once authorized, a device can be given access along with additional policy options based on WPA2-Enterprise, such as dynamic VLAN, ACL, or bandwidth assignment.

When you plan your workflow, you can have a different enrollment sequence for employees and visitors, and for personal and IT-owned devices; adding custom authentication and policy prompts, to allow a separate workflow for each type of user and device in your network environment.

During deployment, all enrollment workflow branches are bundled as one configuration in the Cloudpath system.

## Cloudpath System Specifications

Cloudpath supports the following browsers, operating systems, and third-party identity stores for system and user devices.

**TABLE 1** Cloudpath System Specifications

Supported Browsers for Cloudpath Admin UI	Supported OSes for End-User Devices	Supported Third-Party Identity Stores
Internet Explorer 6.0 and later	Windows 7 and later	Microsoft Active Directory
Firefox 1.5 and later	Mac OS X 10.11 and later	LDAP
Safari 2.0 and later	Apple iOS 9.0 and later	Facebook
Google Chrome 3.0 and later	Ubuntu 15.04 and later	LinkedIn
	Android 6.0 and later	Google Gmail
	Fedora 22 and later	Custom OAuth 2.0 Server
	Chrome OS 51 and later	
	Windows Phone 8+	
	Blackberry (assisted configuration)	
	Windows RT (assisted configuration)	
	Generic (assisted configuration)	
	Windows Mobile 5 and 6 (assisted configuration)	

### NOTE

The supported end-user operating systems are automated and required minimal user interaction. The assisted configuration operating systems require user interaction to configure. Online instructions are provided to the user.

## Prerequisites for Configuring Cloudpath

Before you set up Cloudpath in your network, you need the following information:

### Deploying the OVA (For Local Deployments)

- VMware server or Microsoft Hyper-V Manager on which you'll install the Cloudpath virtual appliance.
- The URL where the image file resides
- FQDN Hostname of the virtual appliance
- IP address and subnet mask for the virtual appliance (not required if using DHCP)
- Gateway IP address for your network (not required if using DHCP)
- IP address of DNS server (not required if using DHCP)
- A list of IP addresses that are allowed Administrative access (optional)
- Service account security credentials

## Setting up the Initial Account

- Activation code issued from Cloudpath Licensing Server
- HTTPS server certificate
- Company Information (Domain, URL)
- DNS hostname
- Active Directory domain, DNS/IP address of AD server, and DN of AD domain or LDAP server
- Web server certificate (public-signed)

If you are not using the Cloudpath onboard CA, you also need:

- Public and Private key of existing CA
- RADIUS server certificate (if not using onboard RADIUS server)

## Configuring the Workflow

This section lists items to consider when you configure the workflow:

- An idea about the types of access and policies you want to offer different users
- Images and color schemes if you plan to customize the webpage display
- AD group names for creating filters in the workflow
- An idea about the security policy for passwords, vouchers, and certificates
  - Vouchers have configurable format and validity periods
  - Certificates have configurable key lengths, algorithm types, and validity periods
- The SSID for the secure network
  - If using VLANs to apply policy, you should have the VLAN IDs

### **NOTE**

For SSID configuration, see [Configuring Cloudpath to Integrate With a Ruckus Wireless LAN Controller](#).

- A list of conflicting SSIDs to prevent roaming (for example, open SSIDs)
- An idea about which OS families and versions to support
- Additional requirements for device configurations (for example, enable firewall, proxy, verify antivirus, enable screen lock pass code)





# Deploying the Cloudpath Virtual Appliance to a VMware Server

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## Overview

Cloudpath supports deployments using a VMware server or Hyper-V Manager. This section describes deploying to a VMware server. For Hyper-V deployments, see the configuration document, *Deploying Cloudpath as a Virtual Appliance using Microsoft Hyper-V*.

### NOTE

If you are setting up a hosted system, you can skip this section and continue to [Initial System Setup](#) on page 19.

Cloudpath can be deployed to a cloud-hosted environment (multi-tenant), or as a virtual appliance on a locally-deployed VMware ESXi server (single tenant).

## Specifications for Locally-Deployed VMware Servers

The Cloudpath virtual appliance is deployed as an open virtualization archive (OVA) file, which can be deployed on any VMware ESXi server (ESX or ESXi architecture 4.x and 5.x and greater).

### NOTE

If using version 6.5 ESXi server, you must use an SHA-256 signed OVA.

Cloudpath offers a Non-Production POC, as well as several Production configurations for deployment. See the [Deploying the Virtual Appliance Using a vCenter VMware Client](#) section for details.

## Retrieve OVA File With Activation Link

If you are setting up a Cloudpath account for the first time, you will be sent an activation code in an email notification. For an on-premise deployment, the activation code link allows you to download the Cloudpath OVA, binding your OVA file to the activation code.

## Deploying the Virtual Appliance Using a vCenter VMware Client

The deployment process consists of the following steps:

- [Deploying the Virtual Appliance Using a vCenter VMware Client](#)

or

- Deploying the Virtual Appliance Using a Console-Based VMware Client
- Activate Account or Log In

## Deploying the Virtual Appliance Using a VMware vCenter Client

1. Open the VMware client.
2. Select **File > Deploy OVF Template**.
3. Enter the file path or URL where the OVA file resides.
4. Accept the EULA.
5. Enter a unique name for the virtual appliance.
6. Select a deployment configuration:
  - Non-Production POC - Deploys using 6GB RAM and 2 vCPUs x 1 Core. Recommended for software trials, feature testing, and other non-production systems.
  - 4,000 or Fewer Users - Deploys using 8GB RAM and 2 vCPUS x 2 Cores. Recommended for production systems with fewer than 4,000 users.
  - 8,000 or Fewer Users - Deploys using 12GB RAM and 2 vCPUS x 4 Cores. Recommended for production systems with fewer than 8,000 users.
  - More than 8,000 Users - Deploys using 16GB RAM and 2 vCPUS x 4 Cores. Recommended for production systems with more than 8,000 users.
  - More than 20,000 Users - Deploys using 20GB RAM and 2 vCPUS x 4 Cores. Recommended for production systems with more than 20,000 users.
7. If you are using VMware vCenter™ Server to manage your virtual environment, select the appropriate data center, cluster, host, and destination storage, as needed.
8. Select a disk format.
  - Use **Thick** provisioning for a production environment. For a thick provision, the total space required for the virtual disk is allocated during creation.

### NOTE

If you are using Fault Tolerance, you must select **Thick** provisioning.

- Use **Thin** provisioning for testing, or if disk space is an issue. A thin provisioned disk uses only as much datastore space as the disk initially needs. If the thin disk needs more space later, it can grow to the maximum capacity allocated to it.
9. Continue the configuration with vCenter, or a non-vCenter console.
    - If you are using the vCenter to configure application and network properties, continue to the next section.
    - If you are using the console to configure application and network properties, review the initial settings and click **Finish**. See *Deploying the Virtual Appliance Using a Console-Based VMware Client* to complete the deployment process.

## Application Properties (vCenter)

Customize the application properties for the deployment.

FIGURE 2 Application Properties

### Cloudpath Enrollment System

#### Hostname (FQDN)

Enter the fully qualified domain name.

#### IP Address

The IP address for this VM. Leave blank if DHCP is desired.

#### Netmask

The netmask or prefix for this VM. Used only if static IP is assigned.

#### Default Gateway

The default gateway address for this VM. Used only if static IP is assigned.

#### DNS

The DNS server(s) for this VM. Supports up to 3 in a comma-separated list. Used only if static IP is assigned.

#### NTP Server

Specify an NTP server. By default, pool.ntp.org will be used.

#### Enable HTTPS?

#### Timezone

#### SSH Access

#### Restrict admin access?

To restrict the admin web UI to certain addresses or subnets, specify a comma-separated list of addresses or subnets (CIDR notation, ex. 192.168.4.1/22).

#### Console Password

Specify the password to be used to access the console or SSH of this VM. Please select a strong password that is compliant with your password complexity policy.

Enter password

Confirm password

Enter a string value with 1 to 100 characters.

1. Enter the **Hostname (FQDN)** for the virtual appliance.

**NOTE**

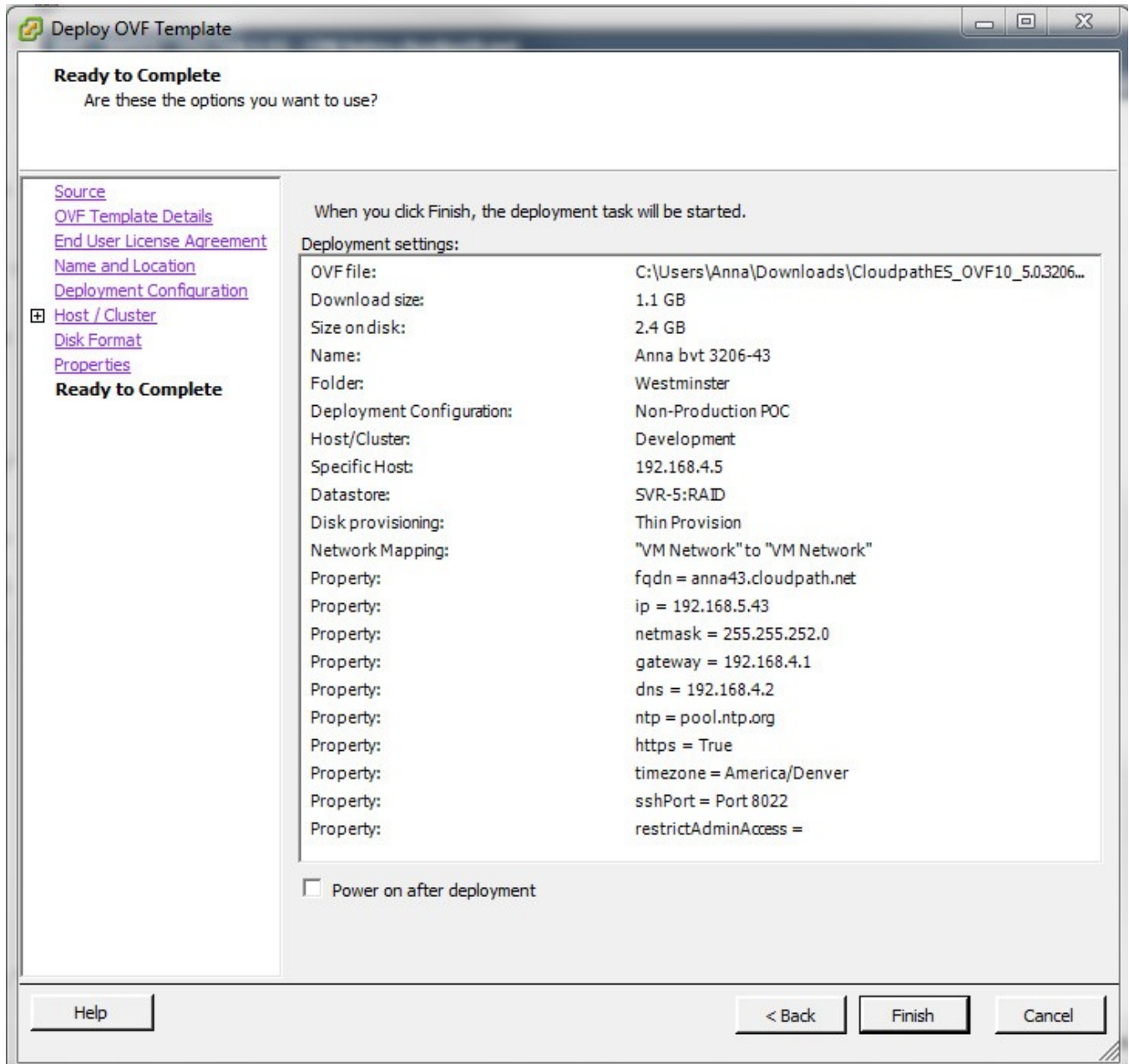
The Cloudpath Hostname is used as the default OCSP Hostname, which is embedded into certificates issued by the onboard root CA as part of the URL for the Online Certificate Status Protocol (OCSP).

2. Enter the **IP Address, Netmask, Default Gateway**, and the **DNS Servers** for this VM. Leave blank for DHCP.
3. Specify an **NTP Server** or leave the default.
4. HTTPS is enabled by default. Leave unchecked only if Cloudpath is behind another web server using SSL.
5. Select the **Timezone**.
6. Select **SSH port**, or disable **SSH Access**.
7. Enter the IP address(es) that can access the **Cloudpath Admin UI**. Leave this field blank if you do not want to limit administrative access.
8. Enter and confirm a service user password. The service user account is used by your support team for access to this system using SSH. The service account is not available if **SSH access** is not permitted.

## Confirm Deployment Settings (vCenter)

1. Verify these properties before you begin the deployment. If you are using DHCP, the networking properties will be blank.

**FIGURE 3** Deployment Settings



2. Click **Finish**. Deployment takes approximately 2 minutes.

# Deploying the Virtual Appliance Using a Console-Based VMware Client

Before you begin, read the list of information required to setup the system.

1. Open a console for the VM.
2. Enter **yes** (or **y**) to accept all license agreements.
3. Enter the time zone. For example, enter **America/Denver**.
4. Enter the **FQDN hostname** for the virtual appliance (for example, **onboard.company.com**).
5. Do you want to enable HTTPS? Enter for **yes** (default) or **n**.
6. Do you want to use a STATIC IP (rather than DHCP)? Enter for **yes** (default) or **n**.
  - If you enter **yes** (recommended), you assign the IP address of the virtual appliance, subnet mask, and gateway and DNS server IP addresses for your network.
  - If you enter **no**, DHCP is used to assign IP address of the virtual appliance interface (ens for VMware, eth0 for Hyper-V), subnet mask, gateway, and DNS server IP addresses for your network. If you are not using DHCP, enter the IP address of the virtual appliance interface.
7. Enter the IP address of the virtual appliance.
8. Enter a subnet mask in the format 255.255.252.0.
9. Enter the gateway IP address for your network.
10. Enter the DNS server IP address.
11. Do you want to permit SSH access? Enter **yes** (default) or **n**.
12. Enter and confirm a service password. The service password is used by your support team for access to this system using SSH. Refer to the *Cloudpath Command Reference* on the **Support** tab for details.

## NOTE

The service account is not available if SSH access is not permitted.

13. Do you want to use an NTP server other than `pool.net.org`? Enter **no** (default) or **y** to specify an NTP server. The setup is complete. Press **Enter** to reboot the system. After the reboot you are presented with the shelluser login prompt.

## NOTE

The **shelluser** is only available during the initial system configuration. After the initial boot, you must use the **service** password to access the system.

## Service Account

When the deployment is finished, you are presented with the service account login prompt.

1. Enter **cpn\_service** at the login prompt, and then the service user password.
2. Enter the **show config** command to verify your configuration. You may be prompted to re-enter the password. See the *Cloudpath Command Reference* on the left menu **Support** tab.

# Activate Account or Log In

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## Overview

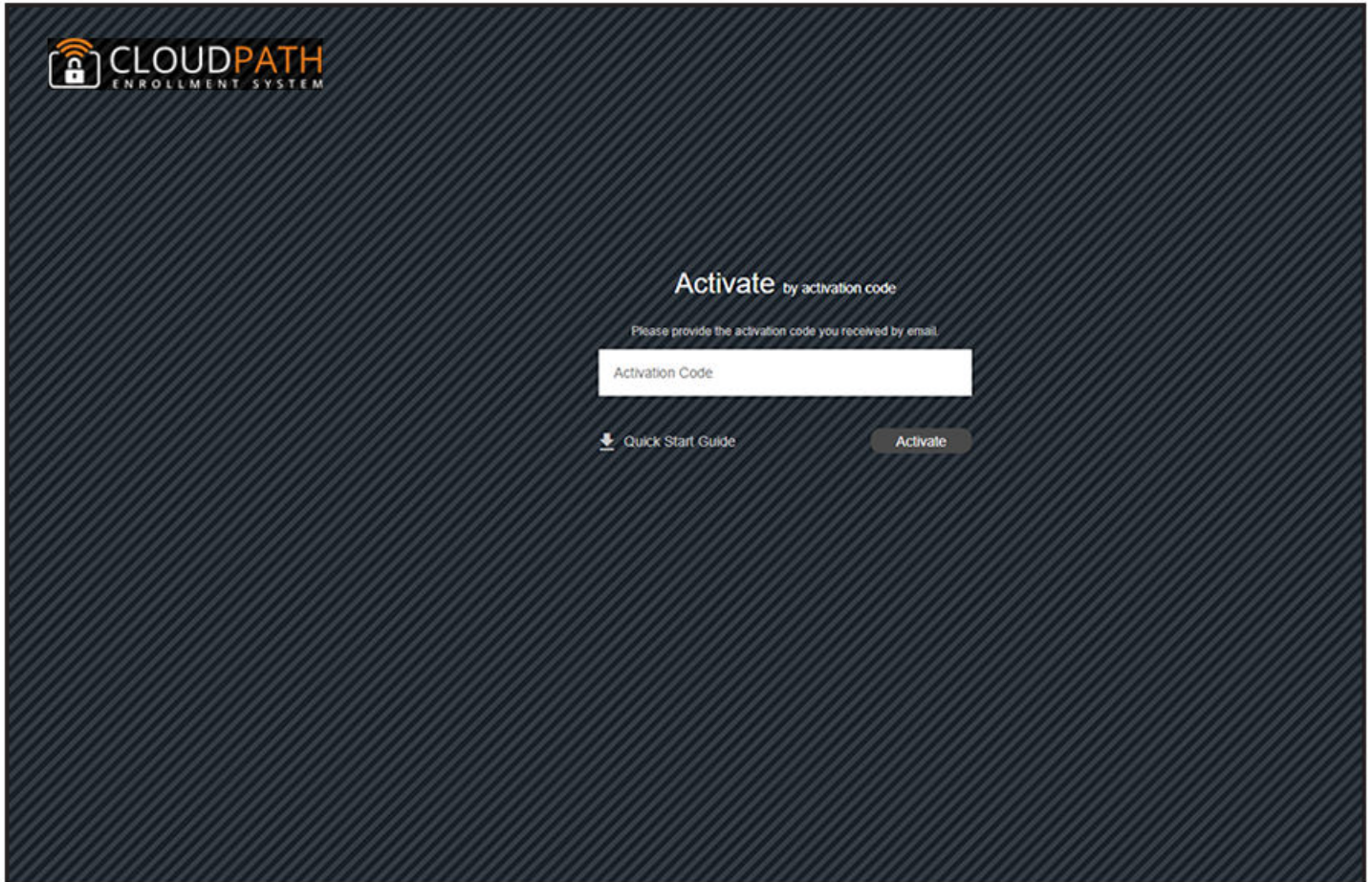
If you are setting up a Cloudpath account for the first time, you will be sent an activation code. If you have existing Cloudpath License server credentials, you can activate an account using those credentials.

Whether you create a new account with an activation code or with legacy Cloudpath credentials, the system binds the Cloudpath instance to your License Server credentials.

## Activate Account by Activation Code

If you have been sent an activation account, enter it on this activation page.

FIGURE 4 Activate Cloudpath Account



## Set a Password for Account

If you have logged in with an activation code, you are prompted to set a password for this account.



FIGURE 5 Set Password

**CLOUDPATH**  
ENROLLMENT SYSTEM

## Password Setup

The following credentials will be used to log into this system in the future.

anna@cloudpath.net

Password

Confirm Password

Submit

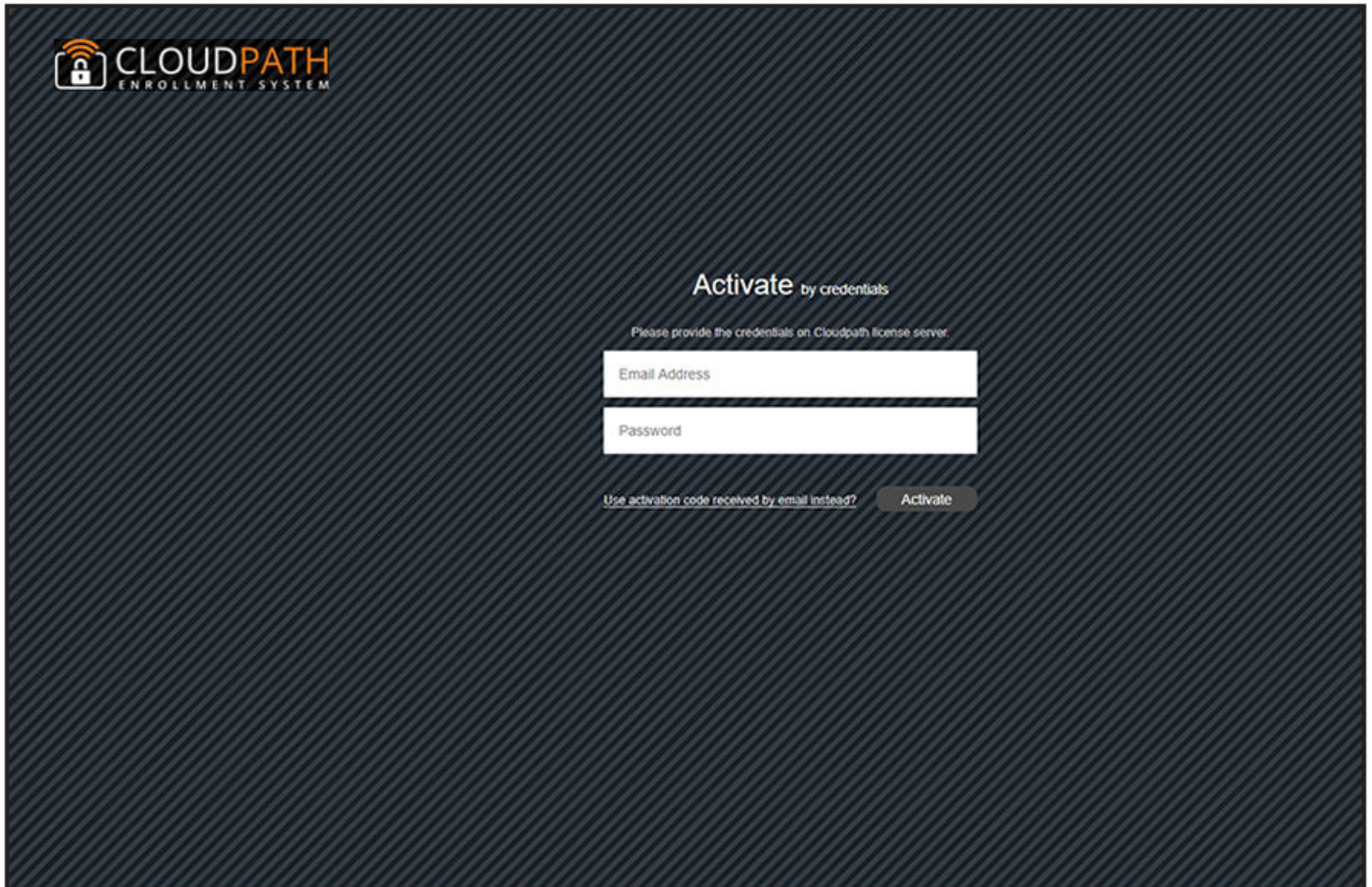
1. Your email address should display. If it does not, enter it on this page.
2. Enter and confirm a password.

These are the credentials to use for this Cloudpath account.

# Activate Account by Credentials

If you already have a Cloudpath License Server account, you can activate a new Cloudpath account or log in to an existing account using those credentials.

**FIGURE 6** Activate Account With Existing Credentials



# Initial System Setup

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## Overview

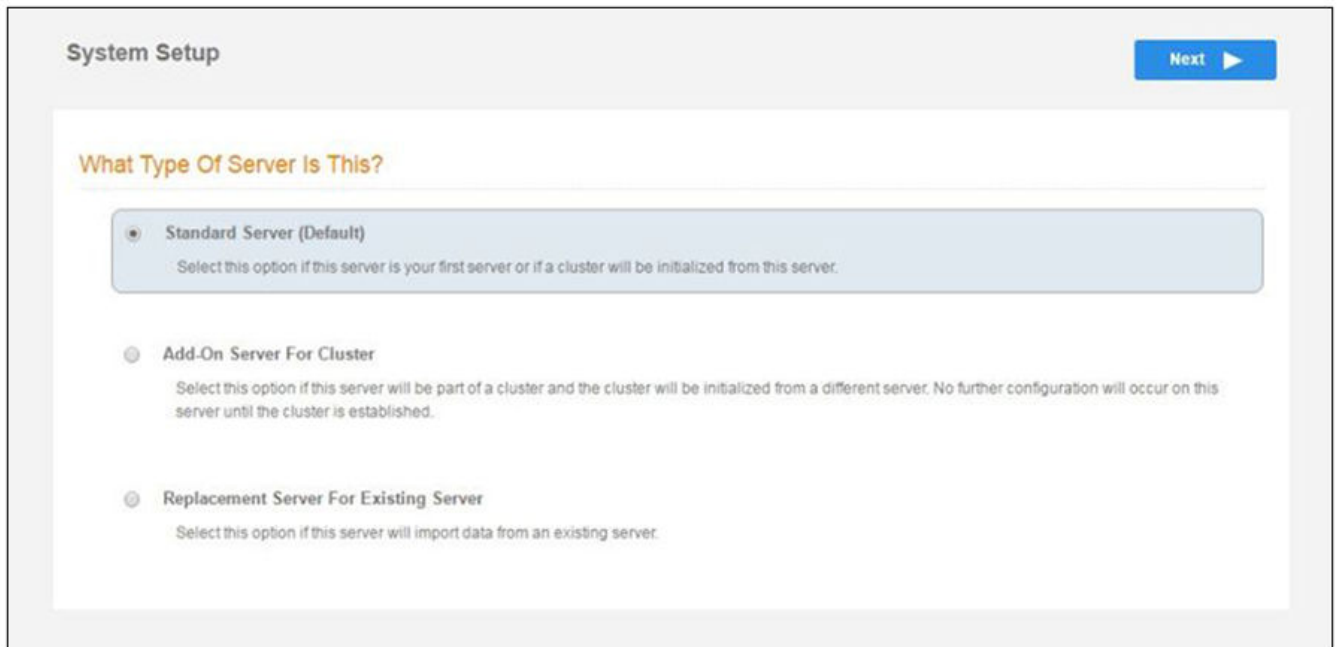
Cloudpath provides you with a single administrator login for the Cloudpath Admin UI. Additional administrators can be added from the left menu Administration tab, or you can enable Administrator logins from your authentication servers.

# System Setup Wizard

After a successful deployment and activation (or login), the **system setup wizard** takes you through a few steps.

1. Select Server Type.

**FIGURE 7** Select Server Type



In most cases, select **Standard Server**, the default. This selection takes you through a setup wizard, which prompts you for the basic information required for an Cloudpath server.

- If you are setting up this server for replication, you can choose to set the server as an **Add-On** or **Replacement** server. These selections provide an alternate set up process, requiring less information for the initial setup. **Add-On** and **Replacement** servers receive most of their configuration from the primary server in the cluster.
- If you are setting up this server to replace an existing server, and you are importing the database from the existing server, select **Replacement Server for Existing Server**.

**NOTE**

For **Add-on** or **Replacement** servers, you will not be required to go through the full system setup.

2. Enter **Company Information**, then click **Next**.  
This information is embedded in the onboard root CA certificate.

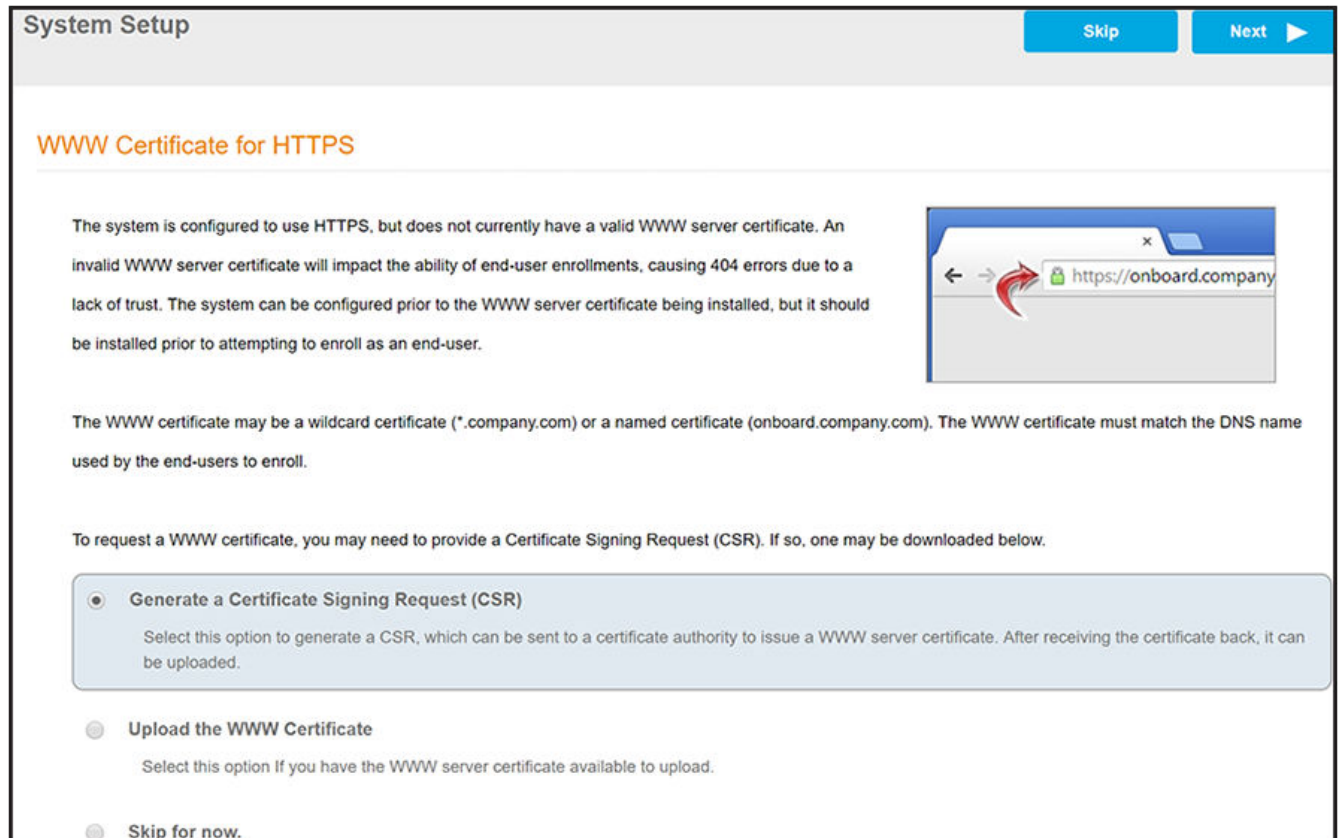
**FIGURE 8** Company Information

The screenshot shows a 'System Setup' window with a 'Next' button in the top right corner. The main content area is divided into two sections: 'Company Information' and 'Company Web Presence'. Each section contains several input fields with a small information icon (i) to the left of the label. The 'Company Information' section includes fields for Company Name, Legal Company Name, Department Name, City, State/Province, and Country. The 'Company Web Presence' section includes fields for Company Domain, Support Email, and IT Email. A mouse cursor is visible over the Country field.

Section	Field Label	Value
Company Information	Company Name	Anna43 Test BVT
	Legal Company Name	Sample Company, Inc.
	Department Name	IT
	City	Westminster
	State/Province	Colorado
	Country	US
Company Web Presence	Company Domain	company.com
	Support Email	support@company.com
	IT Email	it@company.com

3. In the WWW Certificate for HTTPS screen (below), choose the applicable radio button, then click **Next**.

**FIGURE 9** WWW Certificate for HTTPS Screen



**NOTE**

Cloudpath supports web server certificates in P12 format, password-protected P12, or you can upload the individual certificate components: the public key, chain, and private key or password-protected private key.

- If you selected the "Generate CSR" radio button, perform [Step 4](#).
- If you selected the "Upload the WWW Certificate" radio button, perform [Step 5](#).
- You *can* select the "Skip for now" radio button for the initial configuration. However, you should perform this step prior to attempting to enroll as an end-user. To return at a later time to the screen shown above, navigate to **Administration > System Services > Web Server service**, then click **Upload WWW Certificate**. For now, proceed to [Step 6](#)

4. (Only if you selected "Generate CSR" radio button.) You should now be at the Create CSR for HTTPS screen:

**FIGURE 10** Create CSR for HTTPS Screen

- a) Enter the required information.

**NOTE**

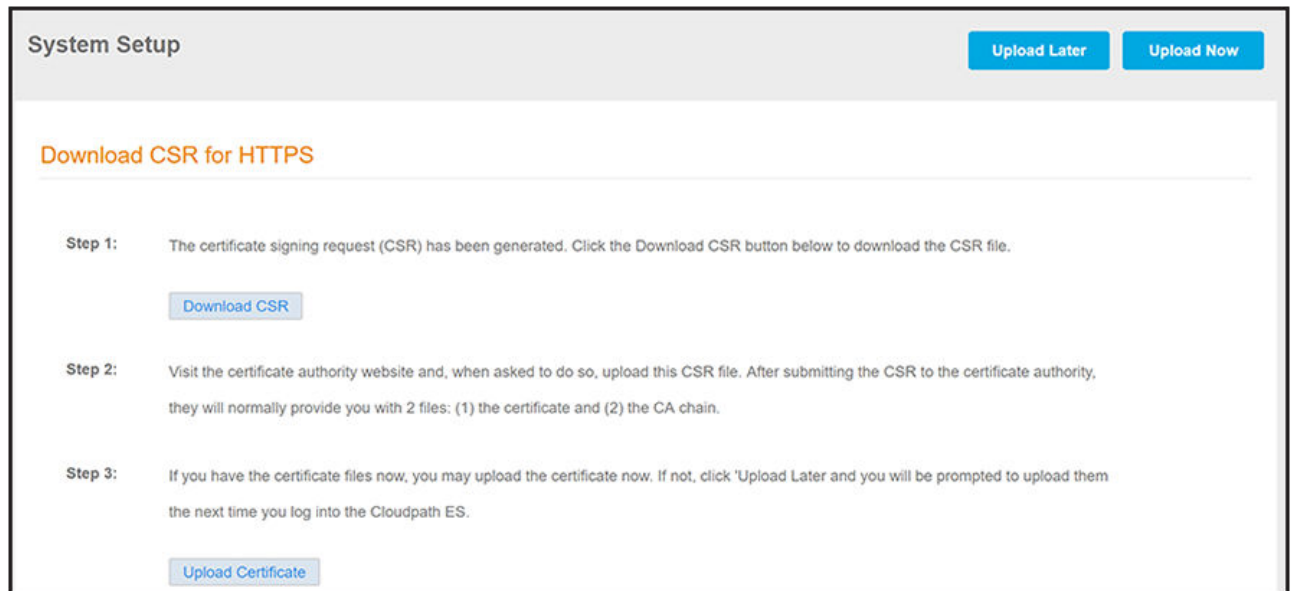
In the Common Name field:

- If you are re-issuing a wildcard certificate, make sure the hostname includes \*. For example: \*.domain.com.
- If using a single-domain SSL certificate, the HTTPS server name should already be populated for you.

- b) Click **Next**.

The Download CSR for HTTPS Screen is displayed:

**FIGURE 11** Download CSR for HTTPS Screen



- c) Click **Download CSR** to download the .csr file, which you can then open in Notepad.
- d) Upload the CSR to any CA website to receive a certificate.
- e) Follow the instructions for the CA website to download the public key and chain.

The public key usually has a filename similar to the domain name. The chain will vary depending on the CA, but it typically contains the word "Root," "Intermediate," " Bundle," or something similar, and may have the filename extension of *.chain*.

- f) In the screen that is shown in [Figure 11](#), click **Upload Certificate**.

You are taken to the screen where you upload the files you received from the CA. The screen below shows the Private Key and the Chain already uploaded, and the Private Key Source is "Certificate is based on the downloaded CSR":



**FIGURE 12** Upload WWW Certificate Based on the Downloaded CSR

**System Setup** Back Next

**Upload by PEM Files**

If a p12 file is not available, you may upload the individual components of the certificate. All files must be in PEM (Base64) format. If the private key is password-protected, specify the password too. If the private key is not password-protected, leave the password blank.

**Public Key (PEM):** Choose File

**Chain (PEM or P7b):** Choose File

**Additional Chain (Optional):** Choose File

**Additional Chain (Optional):** Choose File

**Private Key Source:**

**Upload by P12**

- g) Upload your certificates using the screen shown above.
- h) Click **Next** to continue with the system setup.
- i) Proceed to [Step 6](#).

5. (Only if you selected the "Upload the WWW Certificate" radio button, which you should only have done if you already have received your WWW certificate from a public CA.) You should now be at the following screen:

**FIGURE 13** Upload Existing WWW Certificate

The screenshot shows the 'System Setup' wizard interface. At the top right, there are 'Back' and 'Next' buttons. The main content area is divided into two sections: 'Upload by PEM Files' and 'Upload by P12'. The 'Upload by PEM Files' section includes a note about PEM format and fields for Public Key (PEM), Chain (PEM or P7b), Additional Chain (Optional), Private Key (PEM), Private Key Password, and Prompt for Password on Boot. The 'Upload by P12' section includes a note about P12 format and fields for P12 File and P12 Password. The P12 File field shows a file named 'CloudpathLabWw...rtificate.p12' has been selected.

- a) Upload your certificates using the screen shown above.  
You can do one of the following: 1) Upload the Public Key, the Chain, *and* the Private Key, **or** 2) Upload the P12 file. The example in the screen above shows a P12 file has been uploaded.
- b) Click **Next** to continue with the system setup.
- c) Proceed to [Step 6](#).

6. Select the Default Workflow.

- To initialize the system with a sample configuration, select **BYOD Users & SMS Guests**, or **BYOD Users Only**. This creates an initial workflow for BYOD users and sponsored guests (or BYOD users only) that you can use as a template, or simply add a device configuration and use immediately.
- To create your own workflow, select **Start with Blank Canvas**.

**FIGURE 14** Select Default Workflow



7. Configure the Authentication Server.

**NOTE**

If you selected a Blank Canvas for the default workflow, you are not prompted to set up an authentication server during the initial system setup.

If you plan to use an authentication server to authenticate end-users or sponsors, Ruckus recommends populating the authentication server information page.

If using multiple authentication servers, additional authentication servers may be added through the workflow or from the **Configuration > Authentication Servers** page.

**FIGURE 15** Authentication Server Setup

**Authentication Server Configuration**

**Connect to Active Directory**  
Select this option to enable end-users to authenticate via Active Directory.

Default AD Domain: [ex. test.sample.local]  
AD Host: [ex. ldaps://192.168.4.2]  
AD DN: [ex. dc=test,dc=sample,dc=local]  
AD Username Attribute: SAM Account Name

**Verify Account Status On Each Authentication**

Perform Status Check:

**Additional Logins**

Use For Admin Logins:   
Use For Sponsor Logins:

**Test Authentication**

Run Authentication Test?:

**VLAN Configuration**

Use VLAN Range:

**Connect to LDAP**  
Select this option to enable end-users to authenticate via LDAP (or LDAPs).

**Connect to RADIUS**  
Select this option to enable end-users to authenticate via RADIUS using PAP.

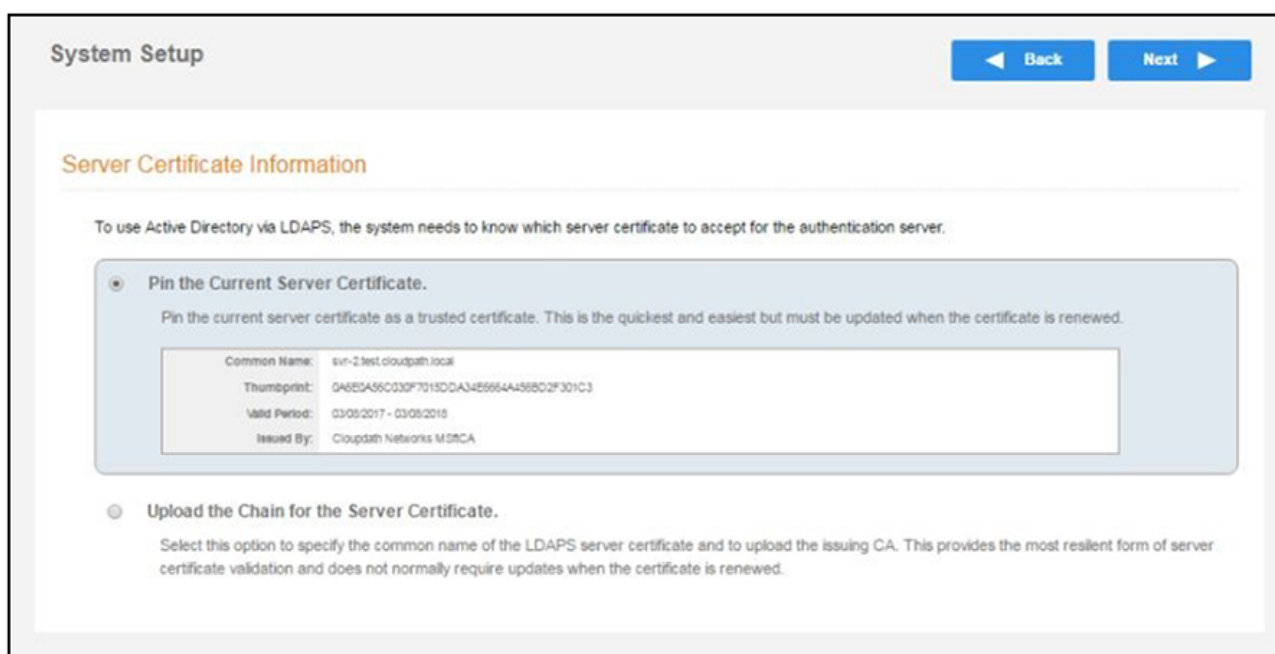
**Connect to SAML**  
Select this option to enable end-users to authenticate via a SAML 2.0 IdP.

**Use Onboard Database**  
Select this option to enable end-users to authenticate to accounts defined within this system.

a) To setup the initial configuration of the Authentication Server, select and enter the required fields.

- b) Consider these optional settings for the authentication server:
- **Verify Account Status on Each Authentication** - If selected, Active Directory is queried during subsequent uses of the certificate to verify the user account is still enabled. You must provide the bind username and password for an authentication server administrator account.
  - **Additional Logins** - If **Use for Admin Logins** is selected, administrators can log into the Cloudpath Admin UI using credentials associated with this authentication server. If **Use for Sponsor Logins** is selected, sponsors can log into the Cloudpath Admin UI using credentials associated with this authentication server.
  - **Test Authentication** - If selected, an authentication will be attempted using the username and password provided to test connectivity to the authentication server. This test can also be run from the workflow.
8. Set up the Authentication Server Certificate:
- a) To use LDAP over SSL (LDAPS), the system must know which server certificate to accept for the authentication server.

**FIGURE 16** Authentication Server Certificate



- b) Select **Upload the Chain for the Server Certificate** to upload a certificate chain from an issuing CA. You must specify the common name for the LDAPS server certificate. This certificate does not need to be updated when the certificate is renewed.
- c) Select **Pin the Current Server Certificate** to use the current server certificate as the trusted certificate. This setting must be updated if the certificate is renewed.

## Publishing Tasks

After the initial setup tasks, the system finishes the initialization process. When the publishing tasks are complete, the system is ready to use. The setup information is also emailed to the system administrator for this account.

**FIGURE 17** System Initialization Status

Initialization Task	Status
Create Certificate Authorities:	✔ Completed.
Create Certificate Templates:	✔ Completed.
Create Device Configurations:	✔ Completed.
Configure Workflow:	✔ Completed.
Activate Sponsor Portal:	✔ Completed.
Publish Enrollment Portal:	✔ Completed.
	✔ System is ready to handle enrollments.
<b>Access Point Setup:</b>	
	The following information will be necessary to configure the access point with the appropriate secure SSID configuration.
SSID:	eng-Anna248 (WPA2-Enterprise, AES (CCMP), Broadcast)
RADIUS IP:	anna248.cloudpath.net
RADIUS Authentication Port:	1812
RADIUS Accounting Port:	1813
RADIUS Shared Secret:	nhu0vjwqedwopth7vw
RADIUS Attributes:	BYOD Policy Template - VLAN: '1'
	Guest Policy Template - VLAN: '1'
<b>User Experience:</b>	
	End-users will use the enrollment portal to activate devices.
End-User Portal:	<a href="https://anna248.cloudpath.net/enroll/Anna248HyperVxpc/Production/">https://anna248.cloudpath.net/enroll/Anna248HyperVxpc/Production/</a>
BYOD:	For BYOD, the authentication server is configured. BYOD users will be moved onto the secure SSID with VLAN '1' assigned.
Guests:	Guests will be required to provide a voucher via SMS or email. SMS is one of several mechanisms for handling guests. Guest users will be moved onto the secure SSID with VLAN '1' assigned.
<b>Administrator Experience:</b>	
Administrator UI:	<a href="https://anna248.cloudpath.net/admin/">https://anna248.cloudpath.net/admin/</a>
Credentials:	The following email addresses have been sent a one-time password along with this information:

## ToDo Items

On subsequent logins, the **Cloudpath Welcome** page is displayed. The **ToDo Items** lists the configuration items needed to complete the account setup.

FIGURE 18 Cloudpath Welcome Page

## Welcome to the Cloudpath ES

Cloudpath ES provides a single point-of-entry for devices entering the network environment. The Automated Device Enablement (ADE) approach gives network administrators control by blending traditional employee-centric capabilities (Active Directory, LDAP, RADIUS, and Integration with Microsoft CA) with guest-centric capabilities (sponsorship, email, SMS, Facebook, and more).

### Getting Started

Use the left menu tabs to begin setting up your workflow configuration.

The *Dashboard* tab displays reporting information about the enrollments, users, devices, certificates, and more.

The *Configuration* tab allows you to configure and deploy the enrollment workflow, including the look & feel and the device configuration.

From the *Sponsorship* tab, you can manage vouchers and voucher lists, and customize the look & feel of the sponsorship portal.

From the *Certificate Authority* tab, you can manually generate certificates, view certificate details, revoke certificates, manage the characteristics of certificates to be issued, and manage certificate authorities (CAs).

The *Administration* tab allows you to manage administrator accounts, system services, diagnostics and logs, and system updates.

The *Support* tab provides access to the Quick Start Guide and several Setup Guides to help with common configurations along with licensing information.

ToDo Items

-  System logging is currently running in debug mode.
-  The workflow is currently blank. Click 'Fix' to begin adding steps to the workflow.





# Enrollment Workflow

---

- Overview..... 33
- Workflow Basics..... 33
- Modifying a Workflow Template..... 34
- Creating a Workflow From a Blank Slate..... 36
- Using the Timed Access Workflow Template..... 56
- Using Auto VLAN..... 59
- Publishing the Enrollment Workflow..... 66
- How to Test a Published Workflow..... 67

## Overview

The Cloudpath workflow engine is a customizable enrollment process that provides more control over who is granted network access and how they should be provisioned.

When you plan your workflow, you can have a different enrollment sequence for employees and visitors, for personal and IT-owned devices; adding custom authentication and policy prompts, to allow a separate workflow for each type of user and device in your network environment.

See Enrollment Workflow Use Cases for an example of the most commonly used workflows.

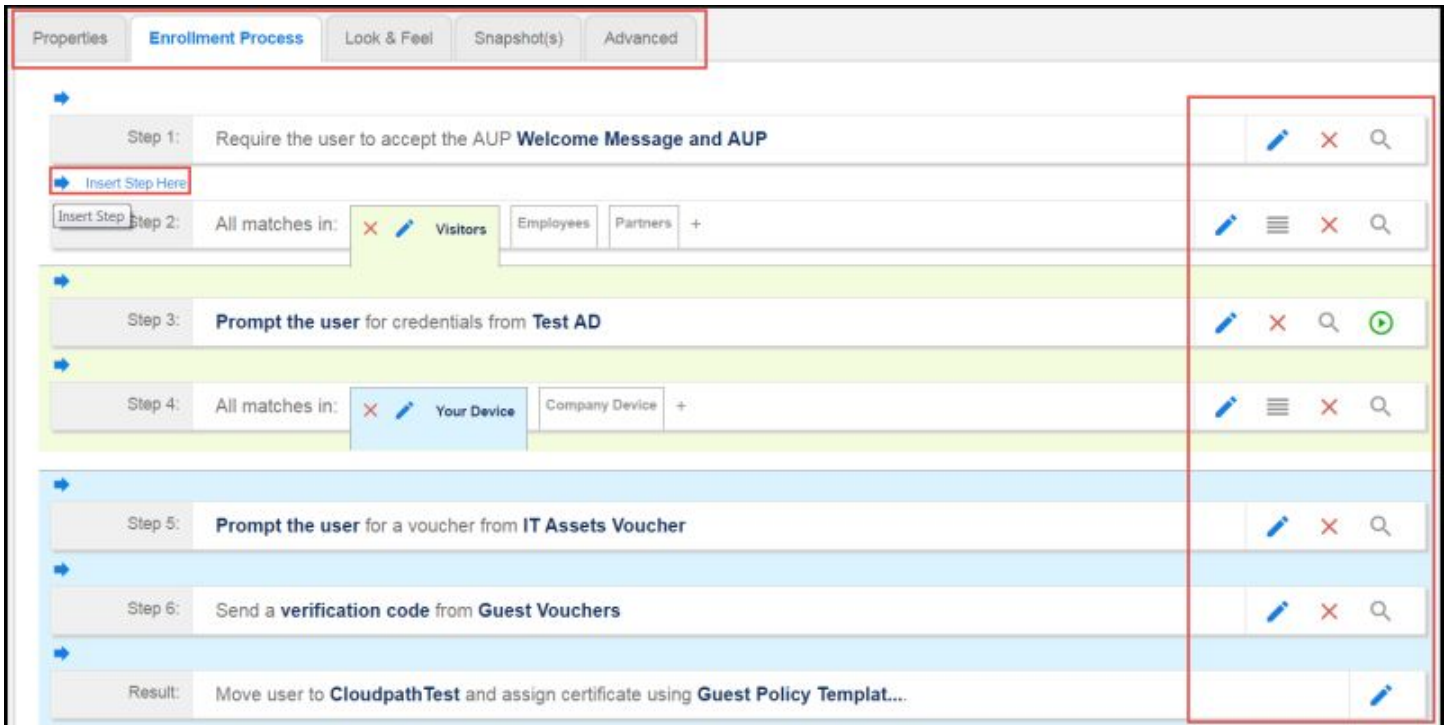
## Workflow Basics

Navigate to **Configuration > Workflows**.



The **Workflow** page has 5 tabs across the top.

- Use the **Properties** tab to update the workflow properties and the **Enrollment Portal URL Options**.
- Use the **Enrollment Process** tab to configure the steps presented to a user to create the workflow.
- Use the **Look & Feel** tab to configure the Cloudpath skin, and to customize the logos, colors, buttons, and images for the Cloudpath server, the Cloudpath Wizard, and the Download page.
- Use the **Snapshot(s)** tab to view the latest snapshot, the version, timestamp and the notes added to a particular workflow.
- Use the **Advanced** tab to view the **Enrollment Portal URL**, **Passpoint OSU URL**, and the **QR code**. You can also use it to **Manage Chromebook Setup and for Cleanup**.

FIGURE 19 Workflow Configuration Page



Use the icons along the side to make changes to the enrollment workflow:

- Use the icons on the right side of each step to edit, modify, delete, view the enrollment steps.
- Use the **Test Server** icon  to verify interaction with an authentication server.
- Use the **Edit List** icon  to label options, to change the order of the selection options in a split, add more options, or add filters and restrictions.
- Use the icons on the split tabs to modify or delete a specific option.

When you create a new workflow, you will choose one of three options from a drop-down list called Workflow Template Type. These options are described in detail in the following sections:

- [Modifying a Workflow Template](#) on page 34
- [Creating a Workflow From a Blank Slate](#) on page 36
- [Using the Timed Access Workflow Template](#) on page 56

## Modifying a Workflow Template

You can modify a standard enrollment workflow template provided by Cloudpath.

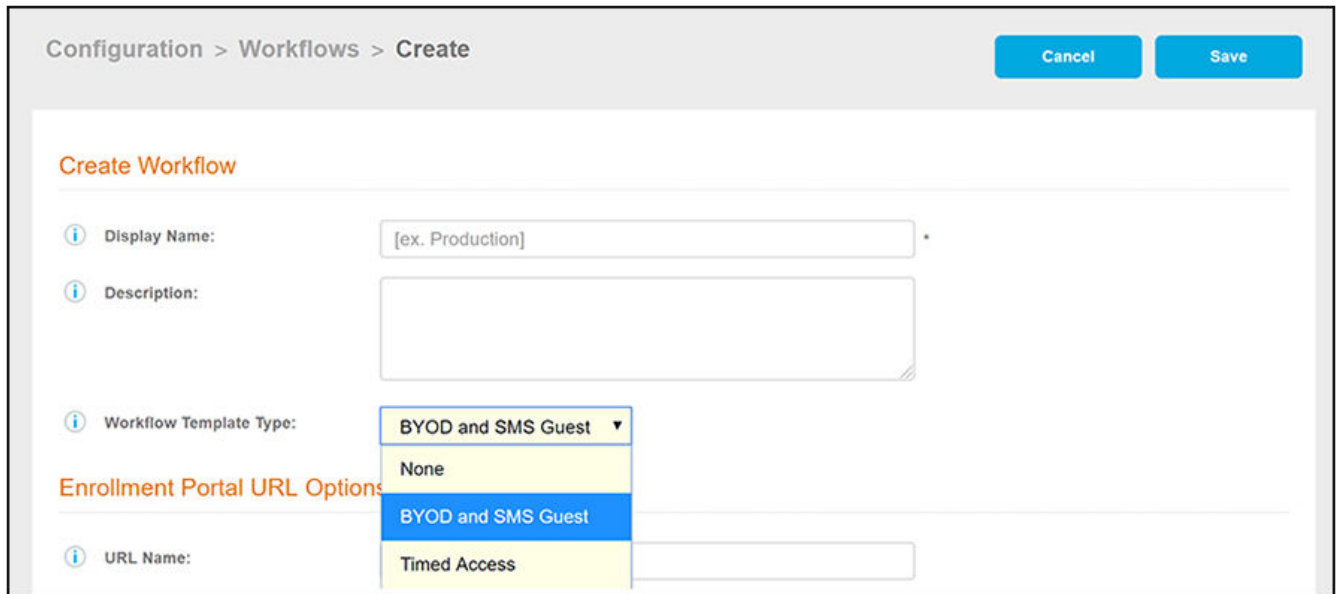
To create a workflow from a template using sample data:

1. Go to **Configuration > Workflows**.

2. On the right hand side of the **Workflow** page select **Add Workflow**.

The Create Workflow screen is displayed:

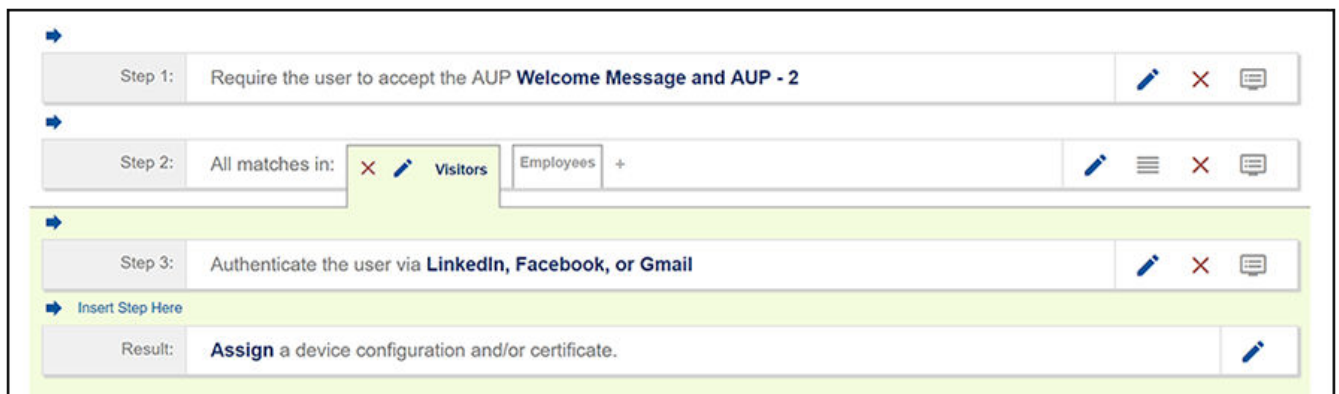
**FIGURE 20** Create Workflow Screen - Selecting "BYOD and SMS Guest" For Workflow Template Type



3. On the **Create Workflow** screen, enter a **Display Name** and **Description**.
4. From the Workflow Template Type drop-down list, select "BYOD and SMS Guest."
5. Fill out the URL Name field.
6. Click **Save**.

A workflow template, which contains a typical workflow sequence, is displayed. The step numbers are shown on the left side of the workflow.

**FIGURE 21** Workflow Template



7. Modify the existing workflow template as needed using the icons on the right side of each step. You can add or remove steps, change the labeling, create filters on the splits, or modify the authentication server.

The workflow template contains basic workflow steps with sample data that can be modified to fit your network plan. These basic steps are described in the following table.

**TABLE 2 Example Workflow Template Steps**

<b>Step 1</b>	Acceptable Use Policy.
<b>Step 2</b>	Split in the workflow to provide a different sequence of enrollment steps for Visitors and Employees. Splits can be modified for other industries (for example, Students, Faculty, and Guests).
<b>Step 3</b>	An authentication step for users.
<b>Result</b>	The final step, which migrates the user to the secure network and assigns a client certificate, is not pre-populated as this information is specific to your network.

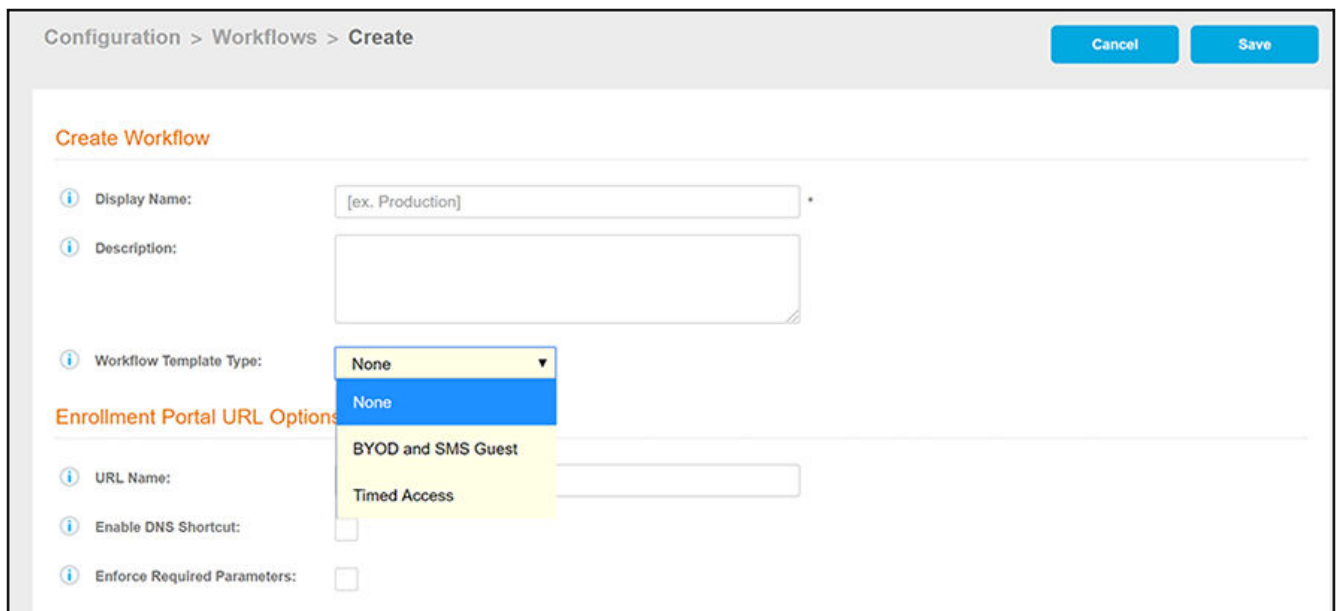
## Creating a Workflow From a Blank Slate

You can create a typical workflow from a blank slate. This sample workflow follows the steps provided in the workflow template.

1. Go to **Configuration > Workflows**.
2. On the right hand side of the **Workflow** page select **Add Workflow**.

The Create Workflow screen is displayed:

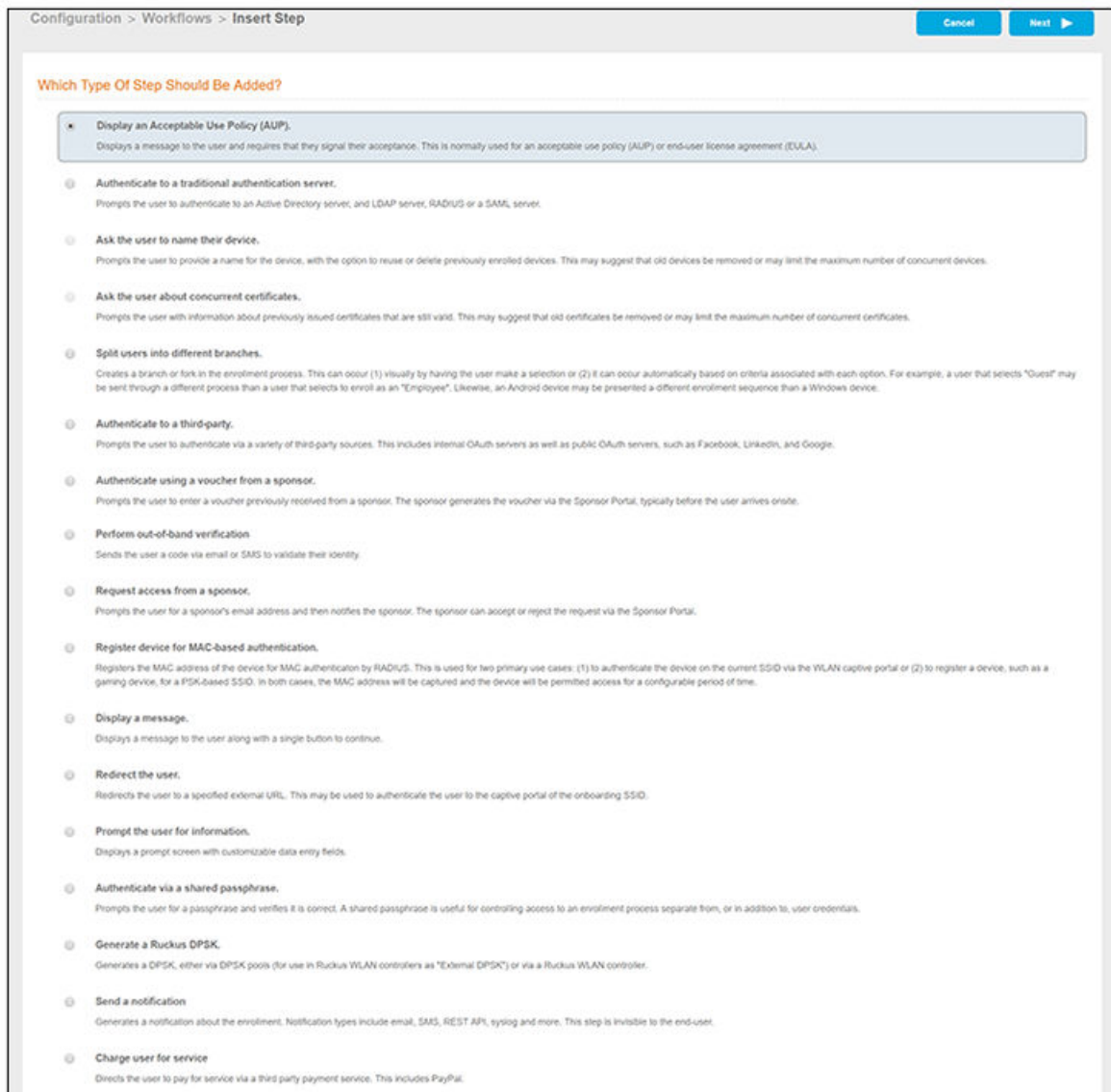
**FIGURE 22 Create Workflow Screen - Selecting "None" For Workflow Template Type**



3. On the **Create Workflow** screen, enter a **Display Name** and **Description**.
4. From the Workflow Template Type drop-down list, select "None."
5. Fill out the URL Name field.
6. Click **Save**, and you are returned to a blank workflow page.

7. On the blank workflow page, click **Get Started** near the bottom of the page to add your first workflow step. A selection page opens that allows you to choose which type of step (workflow plug-in) to add to the enrollment workflow. Every time you add a step, the **Step Selection** page appears.

**FIGURE 23** Enrollment Step Selection



## Acceptable Use Policy

**Step 1** in the workflow requires the user to agree to an Acceptable Use Policy (AUP).

1. Select the button for **Display an Acceptable Use Policy (AUP)**.
2. Select **A new AUP created from a standard template**.

3. On the **Add Acceptable Use Policy** page, enter the **Reference Information** and **Webpage Display Information**. The **Webpage Display Information** is the what the user sees during the enrollment process.

**FIGURE 24** Add Acceptable Use Policy

4. Choose **Standard Template** as the page source and check the **Checkbox Default State** box to specify that the default setting is the acceptance of the AUP. Click **Save**.

The Workflow page displays the enrollment workflow with the AUP acceptance as the first step.

## User Type Split

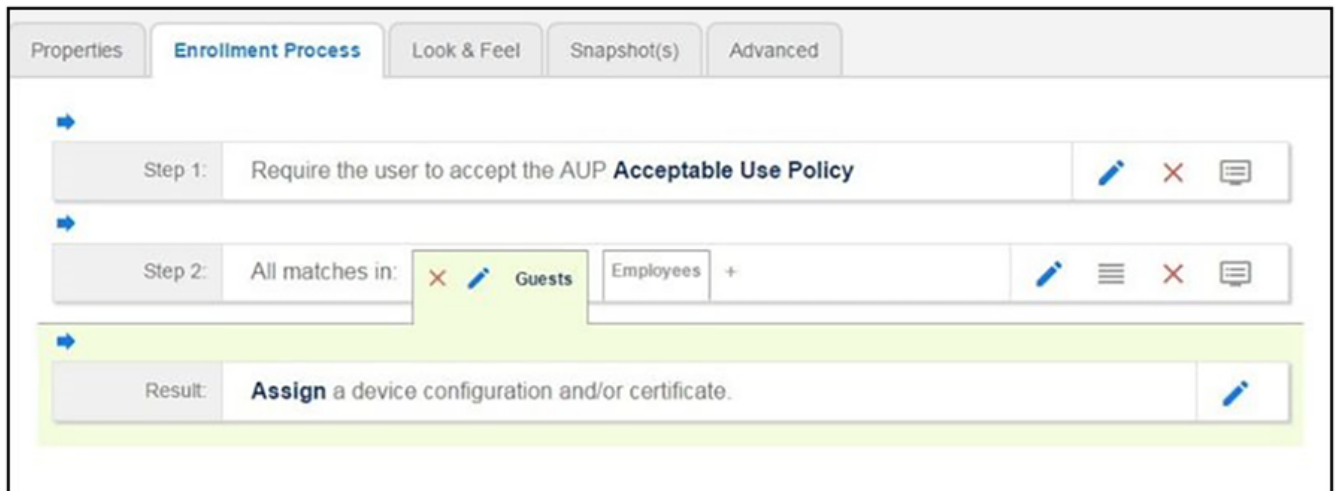
Step 2 in the workflow prompts for the type of user access.

To create a **User Type** prompt:

1. **Insert** a step above the **Result:** step in the enrollment workflow.
2. Select **Split users into different processes**.
3. Select **Use an existing split** and choose **User Type** (a pre-existing split). The **User Type** split creates a prompt to select either the **Employee** User Type or the **Visitor** User Type. These labels can be modified.

The Workflow page displays the enrollment workflow with the **User Type** option after the **AUP step**.

**FIGURE 25** Workflow with User Type Split



## Authentication to a Local Server

Step 3 in the workflow authenticates a user against a Corporate AD server.

You can run the authentication test at any time from the workflow, or from the **Administration > Advanced > Authentication Servers** page.

1. Select the **Employee** tab in Step 2 of the example enrollment workflow.
2. **Insert** a step above the **Result:** step in the enrollment workflow.
3. Select **Authenticate to a local server**.

4. Select **Define a new authentication server**. The **Add Authentication Server** page opens.

**FIGURE 26** Add Authentication Server

The screenshot shows the 'Authentication Server Configuration' page. The 'Connect to Active Directory' section is selected and contains the following fields:

- Default AD Domain: [ex. test.sample.local]
- AD Host: [ex. ldaps://192.168.4.2]
- AD DN: [ex. dc=test,dc=sample,dc=local]
- AD Username Attribute: SAM Account Name (dropdown menu)

The 'Verify Account Status On Each Authentication' section has a checkbox for 'Perform Status Check' which is unchecked. The 'Additional Logins' section has checkboxes for 'Use For Admin Logins' (unchecked) and 'Use For Sponsor Logins' (checked). The 'Test Authentication' section has a checkbox for 'Run Authentication Test?' which is unchecked. The 'VLAN Configuration' section has a checkbox for 'Use VLAN Range' which is unchecked. Below these sections are four radio button options:

- Connect to LDAP (selected): Select this option to enable end-users to authenticate via LDAP (or LDAPs).
- Connect to RADIUS: Select this option to enable end-users to authenticate via RADIUS using PAP.
- Connect to SAML: Select this option to enable end-users to authenticate via a SAML 2.0 IdP.
- Use Onboard Database: Select this option to enable end-users to authenticate to accounts defined within this system.

5. Enter the **Reference** and **Active Directory Information** .
6. (Optional) To test connectivity to the authentication server, select the **Run Authentication Test** box, and enter a Test **Username** and **Password**.
7. (Optional) To allow users from a specific group to log in to the Cloudpath Admin UI as administrators, check the **Use for Login Admin** box and enter the **Admin Group Regex** for the authentication server group.
8. Click **Next**.
9. Select **Use a new webpage created from a standard template**.

The **Create Credential Prompt** page opens.



## Device Type Split

Step 4 adds an enrollment step prompts the user to select a personal device or a company-owned (IT- asset) device.

1. **Insert** a step above the **Result:** step in the enrollment workflow.
2. Select **Split users into different processes.**
3. Select **Use an existing split** and choose **Device Ownership.** The **Device Ownership** option prompts the user to select either **Your Device** or **Company Device.** These labels can be modified.

### NOTE


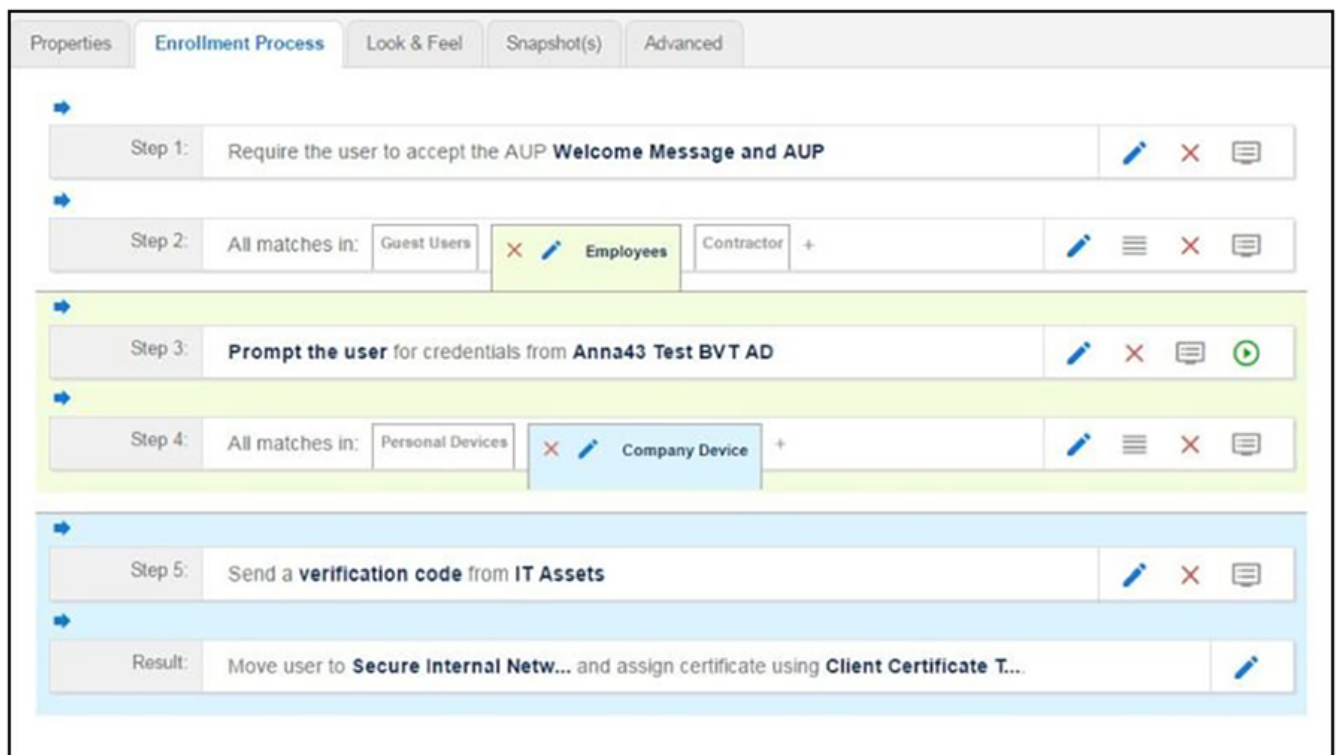
Use the **Edit List** icon  to customize the split option labels.  
The Workflow page displays your enrollment workflow with the Device Ownership option after the user authentication step.

FIGURE 27 Workflow with Device Ownership Split



### Create a Filter in the Device Type Split

When creating splits in the workflow, you can set up a filter so that only certain users see this enrollment step.

For example, create a filter in the Device Type split that allows only users in a specified Active Directory group (ex. **BYOD App**) to receive the option for personal devices. Users that are not in the **BYOD App** AD group do not have the option to enroll personal devices and do not receive the **Device Type** prompt during enrollment.

1. On the **Enrollment Workflow** page, locate the step with the **Device Type** prompt. In this example, it is Step 4.

- On the right side of the step, click the **Edit List** icon to open the **Selection Options** page and edit the **Your Device** option. This opens the **Modify Step** page, which allows you set up filters for this split in the workflow.

**FIGURE 28** Modify Step - Filters and Restrictions

The screenshot shows the 'Filters & Restrictions' configuration page. At the top, there is a title 'Filters & Restrictions' with a dropdown arrow. Below the title is a paragraph: 'The following settings control which users will have access to this option. If nothing is specified below, all users will have access to this option. If criteria is specified below, only users meeting the criteria will have access to this option.'

The page is organized into several sections, each with a title and a list of filters:

- User-Based Filters:**
  - Group Name Pattern: Matches [ex. BYOD]
  - Username Pattern: Matches [ex. bob]
  - User DN Pattern: Matches [ex. \*ou=IT,\*]
  - Email Pattern: Matches [ex. \*@company.com\$]
- Device-Based Filters:**
  - Operating System Pattern: Matches [ex. \*Android.\*]
  - User-Agent Pattern: Matches [ex. \*Safari\*]
  - Language Pattern: Matches [ex. \*en,\*]
  - MAC Registration List: Matches [ex. IT-Owned MACs]
- Location-Based Filters:**
  - Location Pattern: Matches [ex. EMEA]
  - Allowed IPs: [ex. 192.168.4.1/24]
  - Blocked IPs: [ex. 192.168.4.1/24]
- Filters Based On Web Authentication Certificate:**
  - Common Name Pattern: Matches [ex. bob@company.com]
  - Issuer Pattern: Matches [ex. Sample Root CA I]
  - Template Pattern: Matches [ex. BYOD Template]
  - Expiration Date: Expires Within 0 Days
- Other Filters:**
  - Voucher List Name: Matches [ex. Long-Term Voucher List]

3. In the **Filters & Restrictions** section, in **User-based Filters**, enter a regex to matches the **BOYD APP** in the **Group Name Pattern** field. Cloudpath also supports Device-based, Location-based, Web authentication, and Voucher List filters.

This filter only allows users that match the **BYOD APP** AD group name pattern to view the **Personal Device** user prompt. Users that are not in the **BYOD APP** AD group cannot enroll personal devices on the network.

**NOTE**

To see a list of available group names, return to the workflow and run a test on the Authentication Server. The test results show all of the different username patterns for the user.

## Prompt for Voucher

Step 5 adds a voucher verification step for authenticated employees with IT-assets. To create this authorization prompt:

1. Select the **Employees** tab in Step 2 and the **Company Device** tab in Step 4 of the workflow.
2. **Insert** a step above the **Result:** step in the enrollment workflow.

3. Select **Authenticate via voucher** and **Create a new Voucher list**.

**FIGURE 29** Create Voucher List - Format and Notification Fields

Configuration > Workflows > Insert Step

Cancel Back Next

### Create Voucher List

① Display Name: Voucher List

① Description:

① API ID: 0cplst-CE04105D-A3BA-409A-8F2F-A0CDF703CDF0

### Format

① Length: 4

① Characters: alphanumeric (Lowercase)

① Default Validity Length: 7

① Default Reuse Count: Once (One-Time-Password)

① Default Days of Access: 0

① Maximum Days of Access: 7

① Require Username Match:

### Notification

① Email Subject: Network Access

① Email Body: The following voucher code is required to access the network.  
<br/><br/>Voucher Code: \${VOUCHER}

① SMS Subject: Network Access

① SMS Body: The following voucher code is required to access the network.  
Voucher Code: \${VOUCHER}

4. On the **Create Voucher List** page, enter the voucher specifications for the Employees with Company Devices workflow.
  - **Format** - Describes voucher characteristics and validity.
  - **Notification** - Set up the template for emailing the voucher or sending as an SMS message.
  - **Sponsorship** - Use this section to configure the Sponsored Guest Access feature.
  - **Initial vouchers** - Create one or more initial vouchers.

**FIGURE 30** Create Voucher List - Sponsorship, Fields Displayed, and Initial Vouchers

**Sponsorship**

Allow by LDAP Group:

Allow by LDAP Username:

Allow by LDAP Username DN:

Maximum Certificates:

Default Permissions:

- Add/Edit/Delete Sponsors in Group
- Manage Devices Enrolled By Sponsor
- Manage Devices Enrolled By All
- Allow Creation by CSV Upload
- Allow Bulk Creation

New Sponsor Email Subject:

New Sponsor Email Template: 

```
You have been setup as a sponsor. To login as a sponsor, use the information below:  
<br/><br/>URL: ${URL}  
<br/>Username: ${EMAIL}<br/>Password: ${PASSWORD}<br/><br/>On your first login, you will be
```

**Fields Displayed To Sponsor**

Name Field:

Company Field:

Email Field:

SMS Field:

Reason Field:

Redeem By Field:

Reuse Count Field:

Days of Access Field:

**Initial vouchers**

5. For the voucher prompt, select **Create a new webpage from a standard template**.
6. On the **Create Voucher Prompt** page, enter the data for the voucher prompt and **Save**.

The Workflow page displays your enrollment workflow with the **Device Ownership** option after the user authentication step.

## Device Configuration and Client Certificate

A device configuration is a group of settings containing a single configuration per operating system. This configuration determines the settings and behavior required to move the device from the onboarding SSID to the secure network.

The last step in the workflow is to migrate the user to the secure network and assign a client certificate.

### Device Configuration

1. On the right side of the **Result** step, click the **Edit** icon.
2. Select **A new device configuration**.
3. On the **Add Device Configuration** page, provide a name for the device configuration. This is the name a user sees in the device Wi-Fi networks list.
4. Select **Wireless Connections** (the default) and enter the SSID of the secure wireless network.

**FIGURE 31** Configure SSID

#### Connection Type

Select the connection method(s) this device configuration supports:

**Wireless Connections**

- SSID:** TestSSID
- Authentication Style:** Client Certificate [Recommended]
- Is this SSID Broadcast?:** Yes, the SSID is broadcast.

**Wired 802.1X Connections**

5. Set the **Authentication Style**:
  - Select **Client Certificate** for TLS network configurations
  - Select **PEAP** for PEAP/MS-CHAPv2 network configurations
  - Select **Static Pre-Shared Key** for PSK network configurations
  - Select **Ruckus DPSK** for a Dynamic Pre-Shared Key network configuration on a Ruckus controller
6. Leave the default **Broadcast** setting and click **Next**.

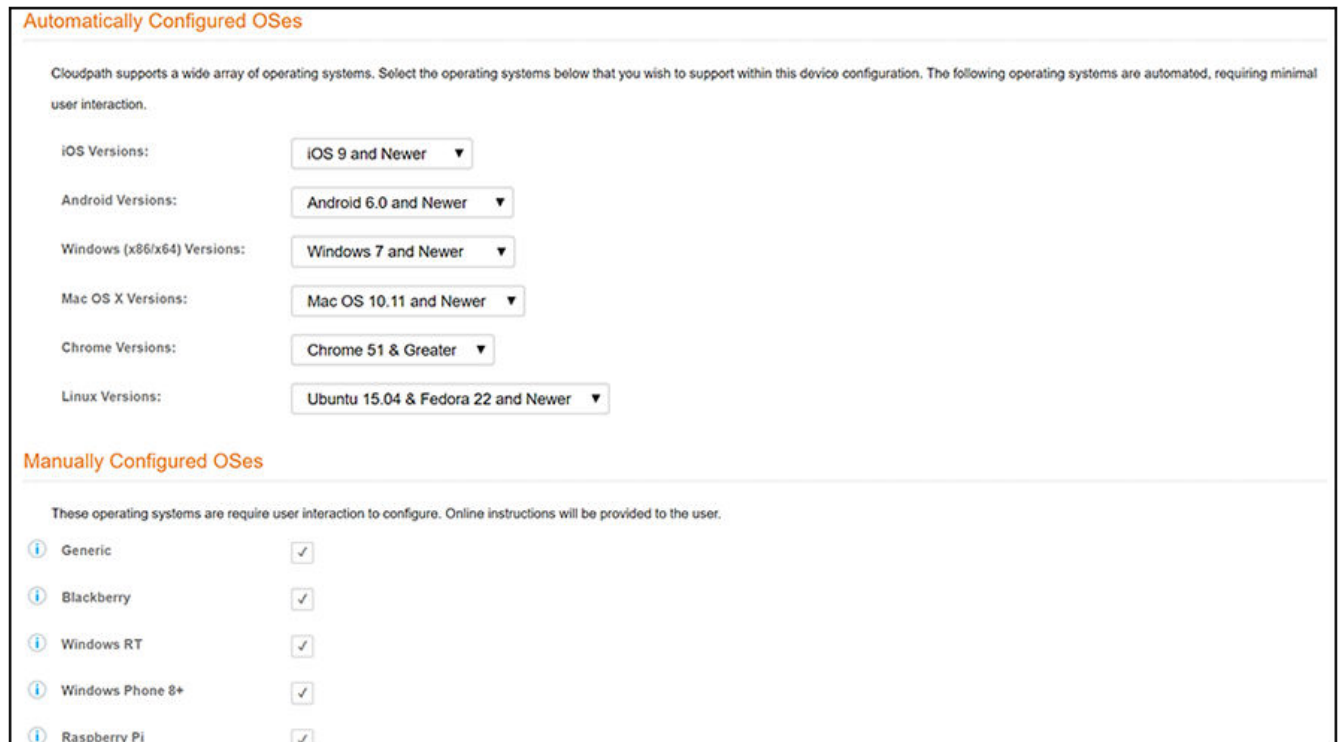
7. Specify **Conflicting SSIDs**.

This setting attempts to deter enrolled devices from joining listed SSIDs after the secure SSID is configured. It is recommended that you include the open-enrollment SSID in this list. Specifying this option is required for mobileconfig-based iOS/macOS enrollments to disconnect from the open-enrollment SSID and re-scan for the secure SSID at the time of the mobileconfig profile installation. *Note that this option is case-sensitive, and the case must match exactly the value broadcast by your wireless network infrastructure.*

For mobileconfig-based Mac OS X enrollments to be disconnected upon profile installation, the "WLAN Profile Type" must be set to "Machine." To locate this setting in the UI, go to **Configuration > Device Configurations**, then click the arrow to expand the device configuration. Next, click the **OS Settings** tab, then click the pencil icon to edit the field called "Configuration from the Network(s) and Trust tabs" under the Mac OS X Settings area. In the Advanced Settings area, see "WLAN Profile Type."

8. Select the operating system families and versions that to support within this device configuration.  
You can restrict a particular version or service pack level after the device configuration is created.

**FIGURE 32** Select OS Versions



9. Select **Client will authenticate to the onboard RADIUS server**.

10. Configure additional settings for the device configuration.

A more comprehensive list of additional settings is available after the device configuration is created.

Continue to the next section to select the client certificate template with the appropriate user policy.

## **Client Certificates**

The final step in the enrollment workflow is to migrate the user to the secure network and assign a certificate to the user device. This section describes how to specify which certificate template to use when assigning a client certificate to the user device.

You can set up different certificate templates for different user types. An employee or staff certificate template might be valid for 120 days, and a guest template might be valid for 1 day or until the end of the week.

After you set up a device configuration for the workflow, you configured and assign a new certificate template.

1. Select **A new certificate template**.
2. Select **Use an onboard certificate authority**.
3. Select **Use an existing CA**. Choose the default Root CA that was created during the initial system setup.



4. Set up the **Client** certificate template. This template is used to issue a certificate to the client device.

**FIGURE 33** Client Certificate Template

The screenshot shows the 'Client Certificates' configuration page. At the top, it states: 'Used on clients to authenticate the client. The decoration of the username within the certificate allows RADIUS policies to be applied appropriately.' Below this, there are three main sections:

- Username Decoration:** A list of radio buttons for selecting a username format. The options are: 'username@byod.company.com' (selected), 'username@contractor.company.com', 'username@faculty.company.com', 'username@guest.company.com', 'username@it.company.com', 'username@student.company.com', and 'username@other.c company.com' (in a text input field).
- Grant Access Until:** A field with the value '1' and a dropdown menu set to 'Years', followed by the text 'after issuance.'
- Configure Advanced Options:** A checkbox that is currently unchecked.

Below these is the **Lifecycle Notifications** section, which includes a descriptive paragraph and four checkboxes for notifications: 'Send welcome email on issuance.', 'Send email 7 days before certificate expiration.', 'Send email if certificate is revoked.', and 'Email administrator if revoked certificate is used.' All checkboxes are currently unchecked.

The final section is **RADIUS Options**, which includes a descriptive paragraph and three text input fields: 'VLAN ID:' with the placeholder '[ex. 50]', 'Filter ID:' with the placeholder '[ex. BYOD]', and 'Class:' with the placeholder '[ex. BYOD]'.

5. Select or enter a **Username Decoration**. The decoration of the username within the certificate allows RADIUS policies to be applied appropriately.

The domain for the **Username Decoration** fields is taken from the **Company Information** that was entered during the initial account setup. Go to **Administration > Company Information** to change the default domain.

- Grant access for the appropriate amount of time.

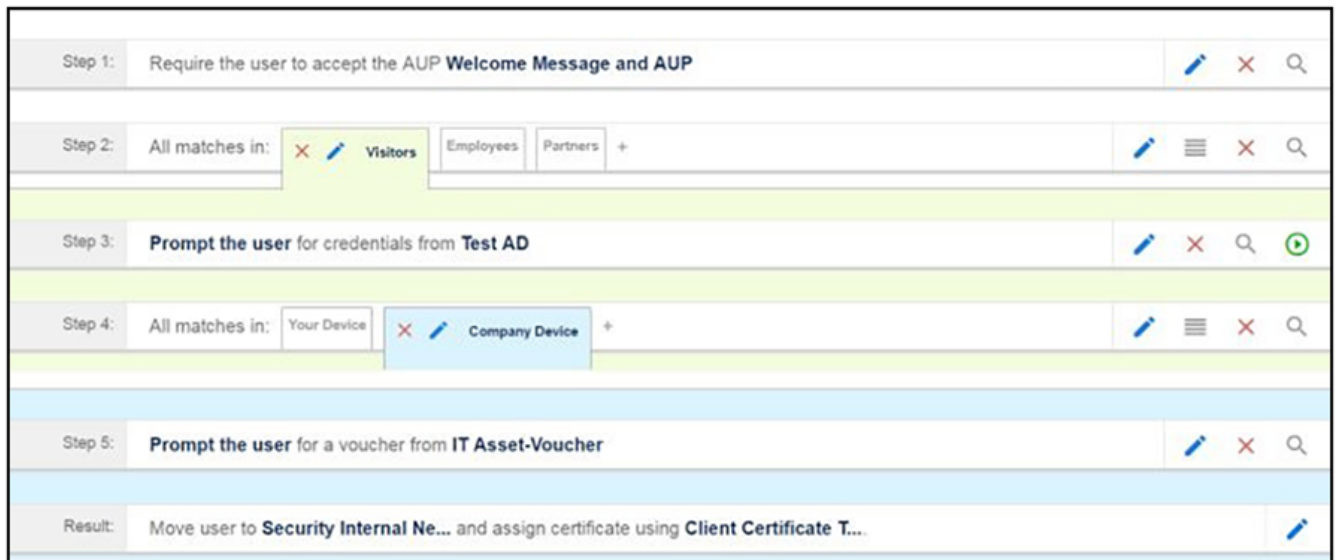
For example, you might have a client certificate template for a guest user that is valid for one, or a few days, another for a contractor that is valid for 6 months, and one for employees that is good for a year.

**NOTE**

To configure pattern attributes, certificate strength, and EKUs, check the **Configure Advanced Options** box before you click **Next**.

- Select any email notifications to be sent to the user related to the life-cycle of the certificate. Additional certificate notifications can be configured after the template is created.
- Optional. Enter **RADIUS Options** to assign a VLAN ID or Filter ID to certificates that use this template. These settings only applies if you are using the Cloudpath onboard RADIUS server.
- Click **Next**. The completed workflow shows all enrollment paths. The last step shows the device configuration which is applied to the user device and the certificate template being used to assign a certificate to the user device.

**FIGURE 34** Completed Workflow



After you have finished configuring a enrollment workflow, create and deploy a snapshot of the workflow configuration to test before deploying to users.

## Charge User for Service

You can build a step into a workflow that directs a user to pay for a service by using a third-party payment system such as PayPal. At this time, PayPal is the only service for which this step can be used.

The sole function of this plugin, called "Charge user for service," is to charge the user for a service, but you must build other steps in your workflow to define the service being provided. If a user is to be limited to a certain amount of time to use a service, such as being granted internet access, you must make sure that the correct timeouts on a corresponding MAC Registration step or Certificate-assignment step are set. Examples are provided later in this section.

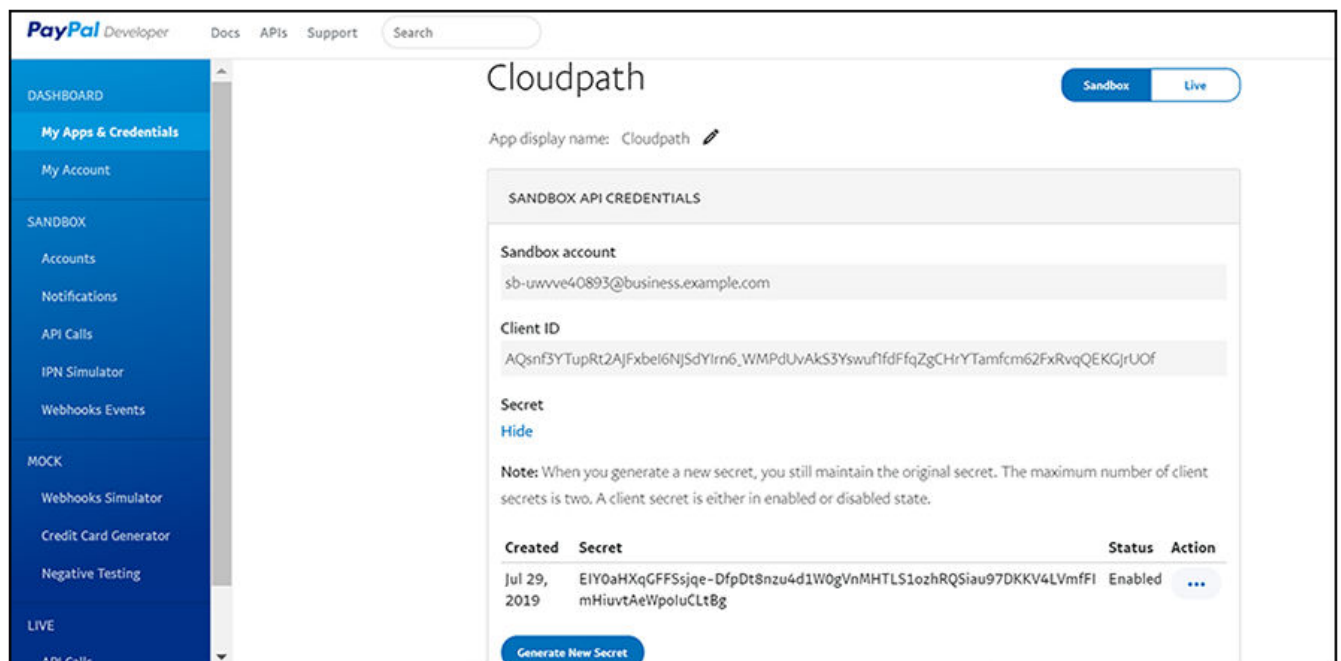
To make this workflow step work properly, you need to create an application using the PayPal developer's site. You then need to configure the workflow step in Cloudpath to communicate with your PayPal application.

### What You Need to Do on the PayPal Developer's Site

Follow these basic steps:

1. Create a business account on the PayPal developer's web site.
2. Refer to the available PayPal developer's documentation on how to create the application you desire for Cloudpath.
3. Give the application a meaningful name so that you know it's intended to communicate with Cloudpath. The following figure shows an example application on the PayPal developer's "Sandbox" (test) location:

FIGURE 35 PayPal Developer's Page



#### NOTE

The example figure above contains information that you will need when you configure the workflow step in Cloudpath. The Client ID and Secret are the key elements of this application because they will need to be copied and pasted into the Cloudpath configuration, described later. *Note that if you change those values in the PayPal application, they will need to be changed in exactly the same way in Cloudpath, or the plug-in will fail.*

### Adding the Corresponding "Charge for Service" Workflow Step in Cloudpath

To add and configure the charge-for-service step in Cloudpath, follow these steps:

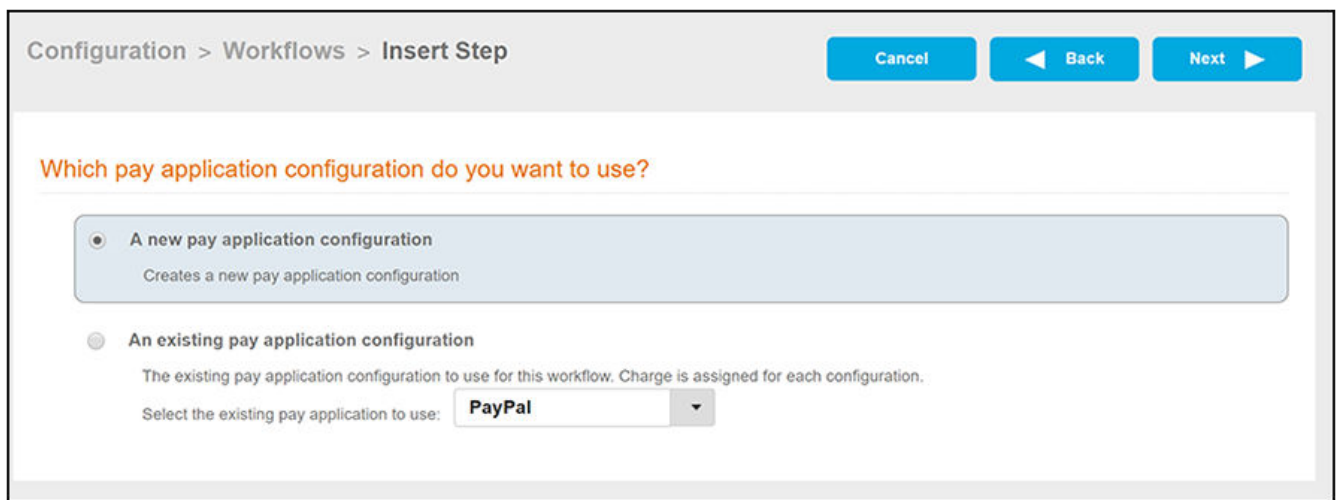
1. In your workflow, click the "Insert Step Here" right-pointing arrow at the desired location to invoke the "Which Type of Step Should Be Added" screen (refer to Figure 23 on page 37).
2. Scroll down and select the "Charge user for service" button:

**FIGURE 36** Charge user for service button



3. Click **Next**. The "Which pay application configuration do you want to use?" screen appears. If a pay application configuration already exists, the screen appears as shown below:

**FIGURE 37** Inserting Pay Application Configuration Step



4. For purposes of this example, select "A new pay application configuration," then click **Next** to invoke the Configure a Pay Application page.
5. Configure the Pay Application page:

**FIGURE 38** Cloudpath UI Pay Application Configuration Screen

Configuration > Workflows > Modify Step

Cancel Save

### Configure a Pay Application

Display Name: PayPal

Description: Your charge for 6 hours of internet service is \$3.50

### PayPal

Environment: Test (Sandbox)

Application Id: AQsnf3YTuPrI2AJFxbel6NJSdYIrn6\_WMPdUvAkS3Yswuf1f

Secret: EIY0aHXqGFFSsjqe-DfpDt8nzu4d1W0gVnMHTLS1ozhRQS

Currency Type: United States dollar (USD)

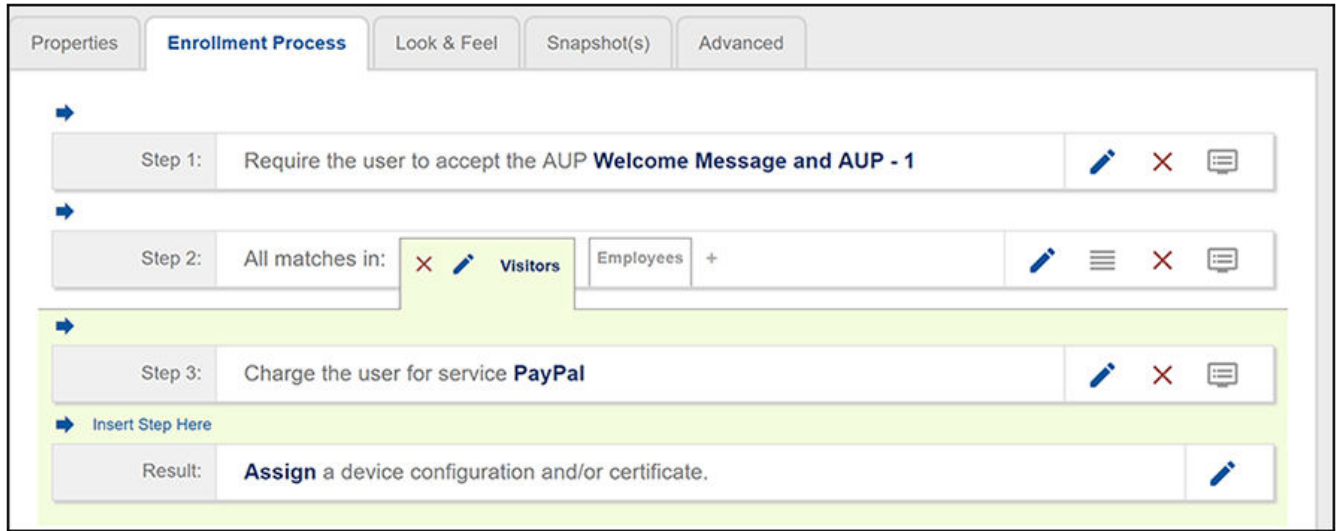
Amount: 3.50

- Display name: Name of the step as you want it to appear in the workflow. This name is visible only to Cloudpath administrators.
- Description (optional): Wording that you want the user to see when they are presented with the third-party service charge screen. (This description, if entered, will appear under the Ruckus logo shown in [Figure 40](#).)
- Environment: Choose between "Test (Sandbox)" and "Production (Live)."
- Application ID: This ID is automatically assigned to your application by PayPal. In PayPal, however, it is called "Client ID," as shown in [Figure 35](#). Copy the Client ID from the PayPal Developer's page and paste it directly into the Application ID field in the Cloudpath UI Pay Application Configuration Screen.
- Secret: This secret is automatically assigned to your application by PayPal. Copy the Secret from the PayPal Developer's page and paste it directly into the Secret field in the Cloudpath UI Pay Application Configuration Screen.
- Currency Type: From the drop-down list, select the currency type to use when the customer is billed.
- Amount: Enter the amount to be charged. You can use decimals for the appropriate currency. (Commas and other formatting are not permitted.)

Click **Save** when you are done configuring the values.

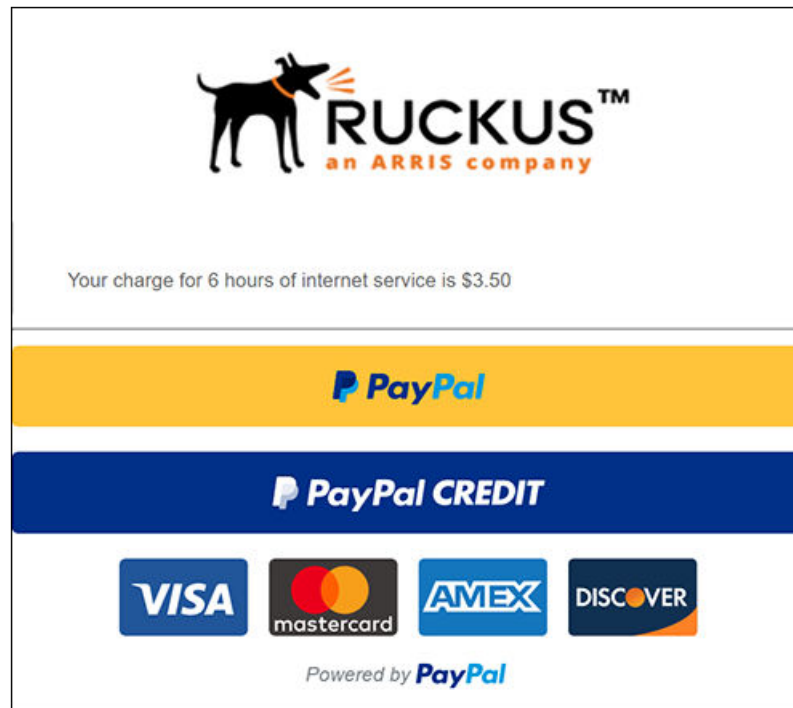
6. After you save the configuration in the previous step, you are returned to your workflow. Check that the PayPal step has been added, as shown in the following example:

**FIGURE 39** Workflow After Adding PayPal "Charge User for Service" Step



7. To the far right of the PayPal step, you can click the Preview icon to view how the user will be presented with this service-charge step:

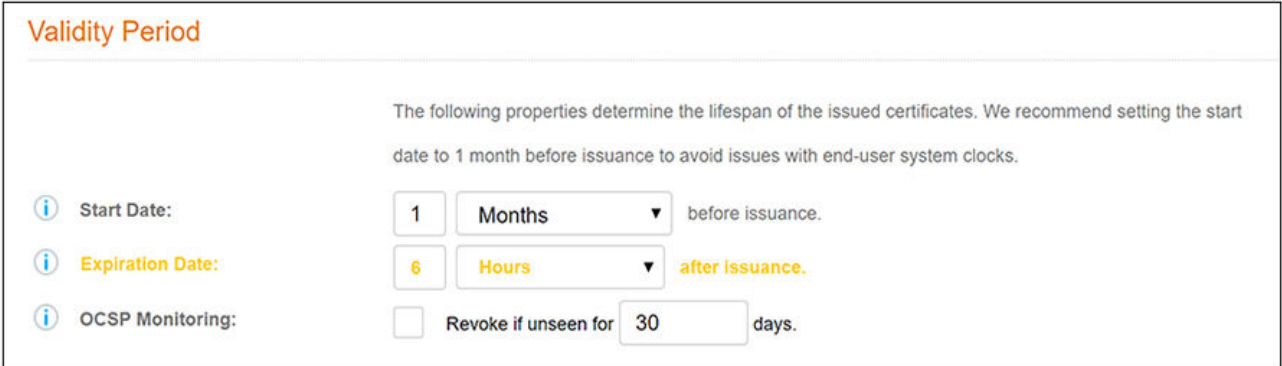
**FIGURE 40** Service Charge Screen Preview



The user will then make a selection to proceed with their payment.

8. You can add additional steps as desired. You at least want to make sure that you add any other steps to support what the user is being charged for. In this example, the user is told there is a charge of \$3.50 for six hours of internet use. Therefore, you want to be sure that the user's session ends after six hours. Methods for doing this include:
  - Making sure to issue a certificate that expires after the desired amount of time. You can go to **Certificate Authority > Manage Templates**, click the pencil icon of the template you are using for onboarding in the workflow, scroll to the "Validity Period" section of the configuration screen for this template, and set the certificate to expire six hours after issuance, as shown below:

**FIGURE 41** Expiration Date Setting for a Certificate



**Validity Period**

The following properties determine the lifespan of the issued certificates. We recommend setting the start date to 1 month before issuance to avoid issues with end-user system clocks.

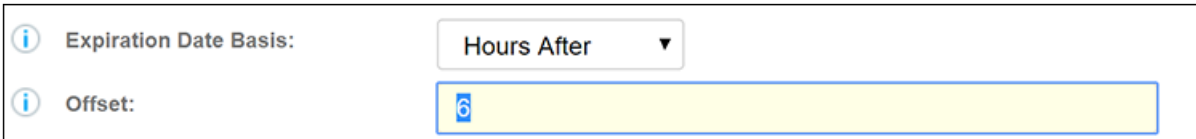
**Start Date:** 1 Months before issuance.

**Expiration Date:** 6 Hours after issuance.

**OCSF Monitoring:**  Revoke if unseen for 30 days.

- Using a MAC Registration step in your workflow, and making sure that the expiration is set as desired. Go to **Configuration > MAC Registrations**. Click the pencil icon of the applicable MAC Registration, and in the "Registration Information" part of the screen, set the fields, as shown below:

**FIGURE 42** Expiration Date Setting for a MAC Registration



**Expiration Date Basis:** Hours After

**Offset:** 6

You might be interested in using the "Charge for Service" plug-in with a Timed Access Workflow, described in the [Using the Timed Access Workflow Template](#) on page 56 section. At the end of that section, which shows a sample workflow that automatically creates and uses MAC Registration lists, you could place a "Charge for Service" plug-in between Steps 5 and 6 in the workflow shown in [Figure 45](#) on page 58, and you could configure the timed MAC Reg lists to match the amount of time for which the user is being granted access.

**NOTE**

The Cloudpath environment for this plug-in is tied directly to the PayPal environment. Therefore, after you have tested your workflow and are ready to go "live," you need to obtain the Client ID and Secret from the live version of the application on the PayPal developer's site, then update the corresponding fields in the Cloudpath UI Pay Application Configuration Screen with those values, then publish the workflow again.

## Using the Timed Access Workflow Template

You can use the Timed Access workflow template to create a workflow that allows limited-time access for a user based on MAC address authentication.

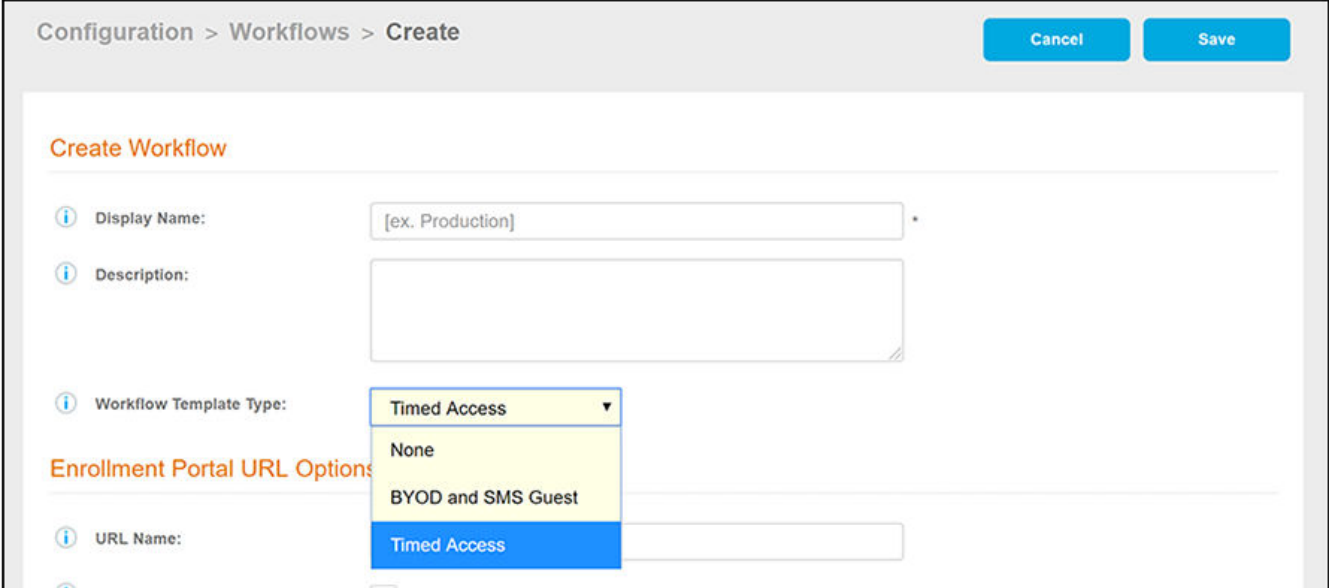
The main concept of the Timed Access workflow template is to give users free access to a network connection for a limited time period, and, when that time period expires, they can re-enroll their device to one of the pre-configured "premium" lists. You can use other workflow plug-ins to add steps to this workflow, and in fact that is how the Timed Access template is intended to be used. An example of a useful plug-in that works well with this template is described later in this section.

The procedure below demonstrates how to create a Timed Access workflow.

1. Go to **Configuration > Workflows**.
2. On the right hand side of the **Workflow** page select **Add Workflow**.

The Create Workflow screen is displayed:

**FIGURE 43** Create Workflow Screen - Selecting "Timed Access" For Workflow Template Type



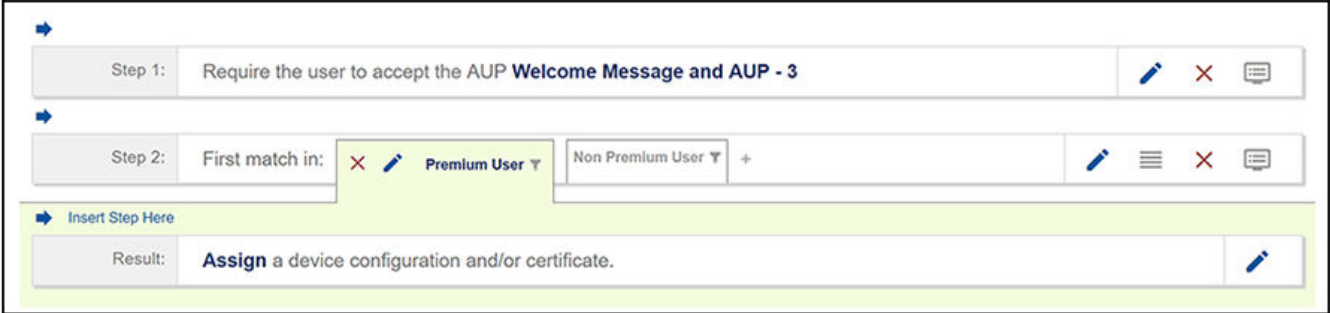
The screenshot shows the 'Create Workflow' screen. At the top, the breadcrumb navigation reads 'Configuration > Workflows > Create'. In the top right corner, there are 'Cancel' and 'Save' buttons. The main content area is titled 'Create Workflow'. It contains several form fields: 'Display Name' with a text input containing '[ex. Production]', 'Description' with a larger text area, 'Workflow Template Type' with a dropdown menu showing 'Timed Access' selected, and 'URL Name' with a text input. Below the 'Workflow Template Type' dropdown, there is a section titled 'Enrollment Portal URL Options' which is partially obscured. The dropdown menu for 'Workflow Template Type' lists 'Timed Access', 'None', and 'BYOD and SMS Guest', with 'Timed Access' highlighted in blue.

3. On the **Create Workflow** screen, enter a **Display Name** and **Description**.
4. From the Workflow Template Type drop-down list, select "Timed Access."
5. Fill out the URL Name field.



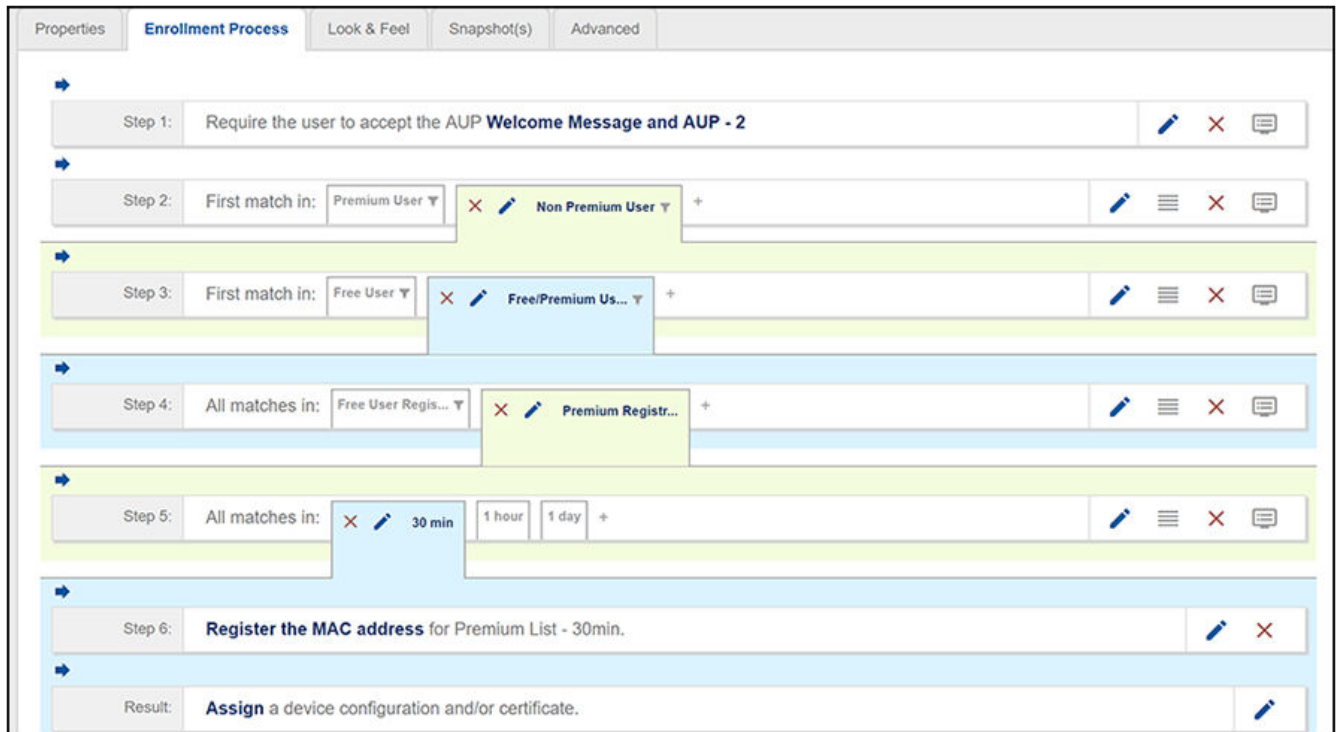
6. Click **Save**, and you are returned to the workflow page that is shown in the following figure.

**FIGURE 44** Timed Access Workflow After Initial Creation



- Expand the workflow to show its complete logic by clicking **Non Premium User**, then clicking **Free/Premium User**, then clicking **Premium Registration**. The workflow appears as shown in the following figure:

**FIGURE 45** Timed Access Workflow Fully Expanded



The following MAC registration lists are automatically created by this workflow template, and can be viewed in the **Configuration > MAC Registrations** portion of the UI:

- Premium List - 1 day
- Premium List - 1 hr
- Premium List - 30min
- Free List

### Free User Registration

The Free User Registration branch is exposed to users only when they enroll for the first time within a 24-hour period. The Free List is pre-configured to have a 30-minute expiration; this list is automatically cleaned up every 24 hours so that users can again use the Free User Registration branch again in the next 24-hour period.

### Workflow Logic:

To understand workflow logic and how the user gets presented with various steps, it is essential to know how "First match in" and "All matches in" work during user enrollment:

- "First match in:" The first branch (going from left to right in the workflow) where the criteria being evaluated matches that of the user is used automatically.
- "All matches in:" All branches are evaluated to determine if the criteria being evaluated matches that of the user. After this determination has been calculated, *all* options that are a match are offered to the user, and the user can select an option from the choices presented. If only one match occurs, the matching branch is used automatically.

The basic steps shown in this workflow are described in the following table.

**NOTE**

In the UI, be sure to use your cursor to hover over the text of each workflow step, and the logic of each possible option is described.

**TABLE 3** Description of Steps in Timed Access Workflow Template

<b>Step 1</b>	Acceptable Use Policy.
<b>Step 2</b>	<p>First match in:</p> <ul style="list-style-type: none"> <li>Premium User: An enrollment whose MAC address is already registered in one of the three premium lists is taken down this branch. This branch is never available to a first-time enrollment in a 24-hour period. If this option is a match, the enrollment then goes directly to the device configuration (Result step).</li> <li>Non Premium User: Any enrollment that does not match the "Premium User" criteria is taken down this branch. A first-time enrollment in a new 24-hour period is taken down this branch.</li> </ul>
<b>Step 3</b>	<p>First match in:</p> <ul style="list-style-type: none"> <li>Free User: An enrollment whose MAC address is already registered in the Free List (and has not yet expired) is taken down this branch. If this option is a match, the enrollment then goes directly to the device configuration (Result step).</li> <li>Free/Premium User: Any enrollment that does not match the "Free User" criteria is taken down this branch.</li> </ul>
<b>Step 4</b>	<p>All matches in:</p> <ul style="list-style-type: none"> <li>Free User Registration: Presented if the MAC address is <i>not</i> currently in the Free List, nor is the MAC address marked as "expired" or "revoked" in the Free List. If this branch is chosen, the MAC address is registered to the Free List and the enrollment is assigned a device configuration (Result step).</li> <li>Premium Registration: Available to all enrollments</li> </ul> <p>A first-time enrollment (for a new 24-hour period) will either be presented with both options or will be taken down the Premium Registration branch.</p>
<b>Step 5</b>	<p>All matches in:</p> <ul style="list-style-type: none"> <li>30 min: Available to all enrollments</li> <li>1 hour: Available to all enrollments</li> <li>1 day: Available to all enrollments</li> </ul> <p>These options are presented to all enrollments who have gone down the Premium Registration branch. The user makes a selection, and the enrollment proceeds with the MAC address getting registered.</p>
<b>Step 6</b>	Register the MAC address: The MAC address is registered in the selected premium MAC Registration list.

You can determine what other steps you want to include in your workflow. For example, a "Charge user for service" step would fit well within a workflow where timed access is involved. You could insert such a step before the MAC Registration step. For information about using the "Charge user for service" step, see [Charge User for Service](#) on page 50.

## Using Auto VLAN

You can use the Auto VLAN feature to assign available VLAN IDs from a configured range of VLANs to users during their enrollment.

The range of VLANs that you configure creates a VLAN pool in the database. Each customer account can have one VLAN pool. Once the pool has been created, you can increase its size by expanding its range. However, if you shrink the size of the pool, existing users who have a VLAN that is outside the new range will maintain that VLAN until the next time they enroll, at which time they are assigned a new VLAN.

There are three main steps to setting up the Auto VLAN feature:

- Assigning the `#{VLAN_POOL_ASSIGNMENT}` variable in the desired area of Cloudpath. For example, you can use this variable for certificates, MAC registrations, and legacy DPSK. Using this variable allows the RADIUS server to select the

VLAN port assigned to an authenticated user. This section will use certificates as an example of how to enact the Auto VLAN feature, but refer to [Other Areas of the Cloudpath UI Where You Can Use Auto VLAN](#) for additional information.

- Enabling the feature for your authentication server in the **Configuration > Authentication Servers** portion of the UI
- Defining the VLAN Range and the default VLAN in the **Administration > System Services** portion of the UI.

### Configuration Steps for Setting Up the Auto VLAN Feature In a Certificate:

Follow the steps below to configure the Auto VLAN feature in an onboarding certificate:

#### NOTE

The same general steps apply if you want to set up Auto VLAN for another area of the UI where you define a VLAN

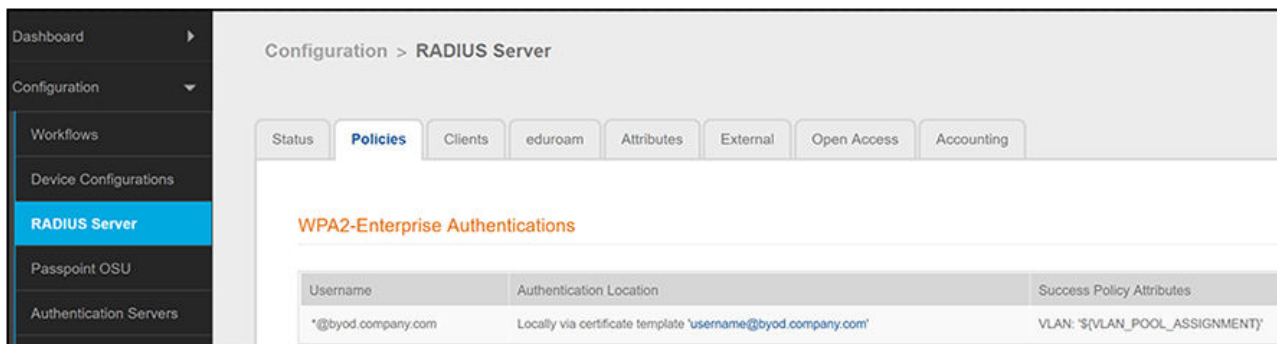
1. Go to **Certificate Authority > Manage Templates**.
  - a. Click the pencil icon to the right of the onboarding certificate template.
  - b. Scroll down to the Policy - RADIUS Attributes section.
  - c. In the VLAN ID field, enter the variable: `#{VLAN_POOL_ASSIGNMENT}` thereby allowing the RADIUS server to select the VLAN port that gets assigned to an authenticated user.

**FIGURE 46** Certificate Template VLAN Variable Setting

The screenshot displays the 'Policy - RADIUS Attributes' configuration interface. At the top, there is a checkbox for 'Allow Authentication via RADIUS' which is checked. Below this is a diagram showing a device (labeled 'Login By Certificate bob@byod.sample.com') connected to a RADIUS server (labeled 'RADIUS Policies ex. VLAN: 50'). A text box explains: 'When a device authenticates using a certificate from this template, Cloudpath will return RADIUS attributes based on the information below. These attributes may be used to apply a dynamic VLAN, an ACL, or other connection policies.' Below the diagram are several configuration fields: 'Reply Username' is set to 'Certificate Common Name (Default)'; 'Allowed SSID(s)' is set to '\*'; 'VLAN ID' is set to ' #{VLAN\_POOL\_ASSIGNMENT} '; 'Filter ID' is set to '[ex. BYOD]'; 'Class' is set to '[ex. BYOD]'; and 'Reauthentication' is set to '[ex. 86400] Seconds'. A blue plus sign is visible at the bottom of the configuration area.

- d. Click **Save**.
- e. To confirm that the variable setting was properly set, you can go to **Configuration > RADIUS Server**, click the Policies tab. Under the "Success Policy Attributes" column, you should see the variable:

**FIGURE 47** Confirming VLAN Variable in RADIUS Server Policies



2. For each traditional authentication server that you want to support this feature, you must enable the "Use VLAN Range" check box:
  - a. Go to **Configuration > Authentication Servers**.
  - b. Whether you are adding a new authentication server or need to edit the configuration of an existing authentication server, go to its configuration, as shown in the example figure below for an Active Directory authentication server.
  - c. Enable the "Use VLAN Range" checkbox, as shown in the figure below. (Note that it is not enabled by default.)

**FIGURE 48** Enabling Checkbox to Use VLAN Range on Active Directory Authentication Server

The screenshot shows a configuration page titled "Connect to Active Directory". It includes several input fields and checkboxes. The "Use VLAN Range" checkbox at the bottom is checked. Other fields include Reference Name (Corporate AD), Default AD Domain (demo.sample.local), AD Host (ldaps://192.168.4.170), AD DN (dc=demo,dc=sample,dc=local), and AD Username Attribute (SAM Account Name). There are also sections for "Verify Account Status On Each Authentication", "Additional Logins", "Test Authentication", "Server Certificate", and "VLAN Configuration".

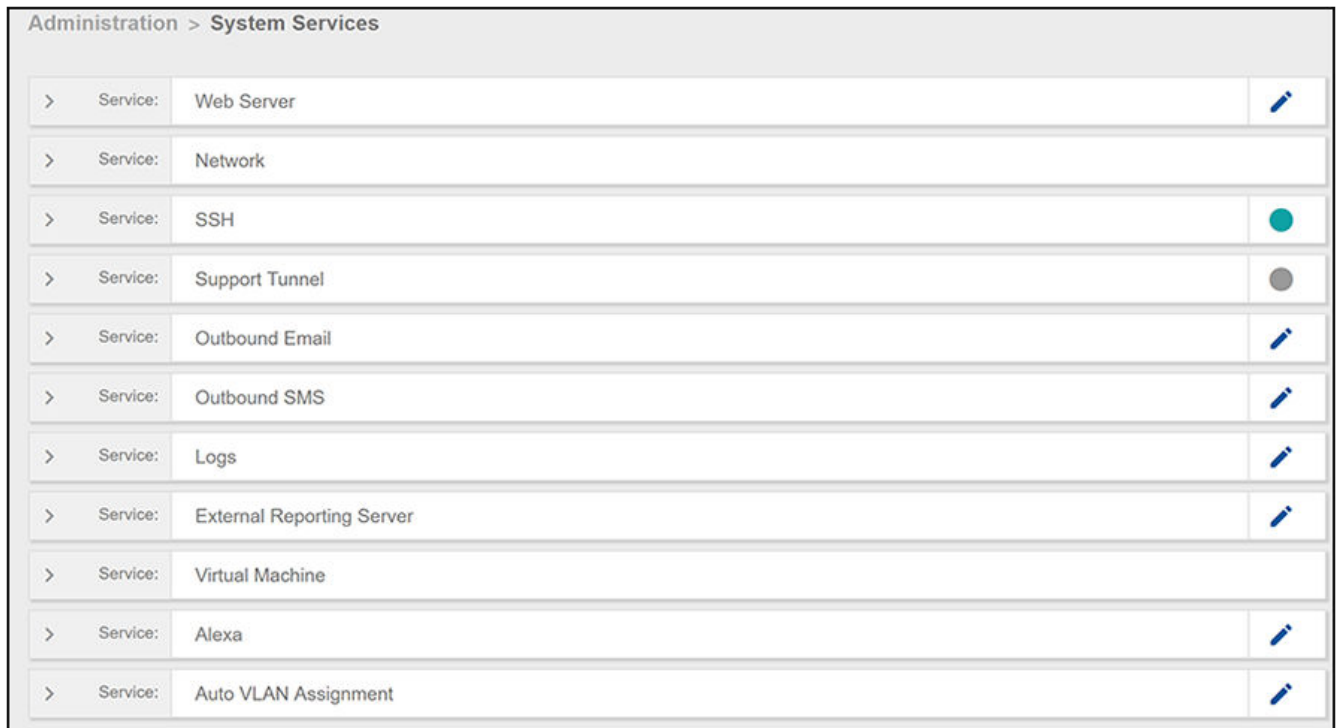
Field/Option	Value/Status
Reference Name:	Corporate AD
Default AD Domain:	demo.sample.local
AD Host:	ldaps://192.168.4.170
AD DN:	dc=demo,dc=sample,dc=local
AD Username Attribute:	SAM Account Name
Perform Status Check:	<input type="checkbox"/>
Use For Admin Logins:	<input type="checkbox"/>
Use For Sponsor Logins:	<input checked="" type="checkbox"/>
Run Authentication Test?:	<input type="checkbox"/>
Reset Trusted Server:	<input type="checkbox"/>
Use VLAN Range:	<input checked="" type="checkbox"/>

**NOTE**

Without this check box enabled, a VLAN will not be assigned to a user, and any currently assigned VLANs will be removed from users if they re-enroll by means of an authentication server where this box is not checked.

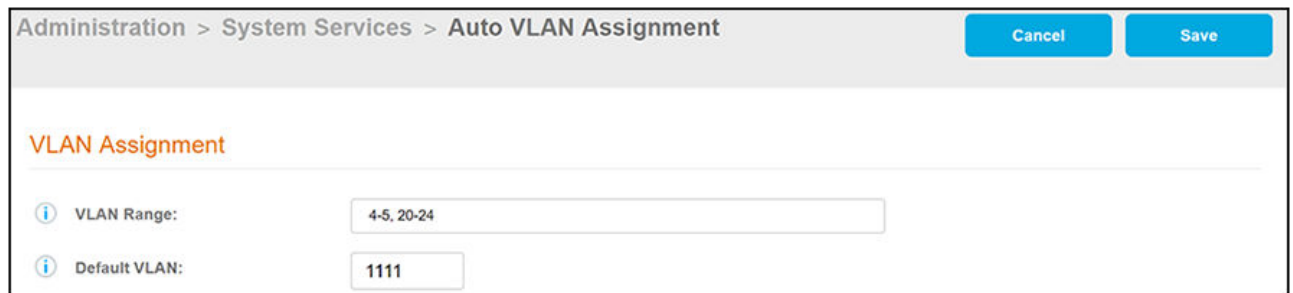
- d. Click **Save**.
3. Go to **Administration > System Services**:

**FIGURE 49** System Services Page



- Scroll down and click the pencil icon to the right of the "Auto VLAN Assignment" service.
- Set the values as desired in the VLAN Assignment window; an example is shown below:

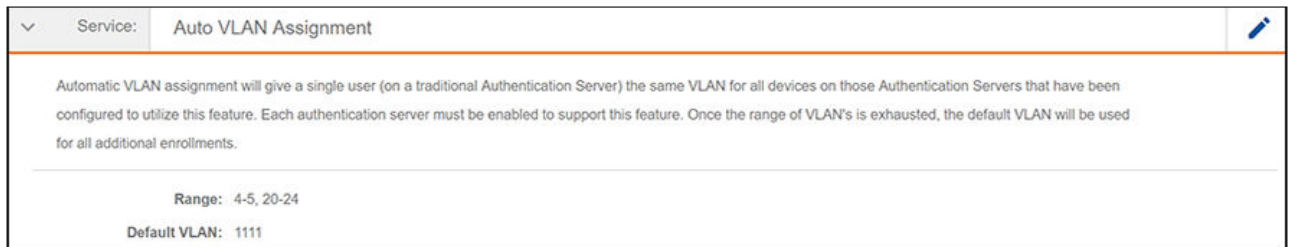
**FIGURE 50** VLAN Assignment Window in System Services



- VLAN Range: Range to use for automatic VLAN assignment. A single user is assigned the same VLAN for all devices. Any changes to the range will affect future enrollments only.  
Example of how to specify a range in a valid format: 1-142, 532, 1000-1235
  - Default VLAN: The VLAN to use once all other VLANs defined in the pool have been assigned to other users.
- Click **Save**.

The following figure shows the Auto VLAN Assignment service expanded after the VLAN assignments have been saved:

**FIGURE 51** Auto VLAN Assignment Information



## How the VLAN ID Gets Assigned During Enrollment

As an enrollment is made that uses a traditional authentication server (as specified when you create your workflow), an identity is either created or retrieved from the database. If the identity is on an authentication server with the "Use VLAN Range" checkbox enabled, a VLAN is selected (lowest available number), and the identity is assigned to this VLAN. This VLAN is shown in the User Information section of the **Dashboard > Users & Devices** page. For example, if the configured the VLAN ranges are 4-5 and 20-24, as shown in the figure above, the first user who enrolls would be assigned a VLAN ID of 4 because 4 would be the lowest available number (see the "VLAN Assignment" field in the figure below):



**FIGURE 52** Dashboard: Users & Devices Information Shows Vlan Assignment

The screenshot shows a 'User Information' panel with the following details:

- Username:** bob
- Email Address:** bob@cloudpath.net
- Blocked:** No. [Block](#)
- Common Name:** Bob Smith
- Distinguished Name:** CN=Bob Smith,CN=Users,DC=demo,DC=sample,DC=local
- Office Name:** Bob Office
- Department:** Bob Dep
- Company:** Bob Corp
- Server Name:** Corporate AD
- Server Type:** Active Directory
- Domain:** demo.sample.local
- Vlan Assignment:** 4
- Groups:** BYOD-EMPLOYEE  
Allowed RODC Password Replication Group  
Administrators
- Actions:** [Revoke/Block All Enrollments](#)

**NOTE**

All devices registered to the same user/identity are assigned the same VLAN ID.

If an authentication server has *not* been enabled to support the VLAN behavior, then any existing VLAN assignments are removed from the user during enrollment, and that VLAN ID then is released back into the VLAN pool for use by an authentication server that *does* support the VLAN behavior.

## Other Areas of the Cloudpath UI Where You Can Use Auto VLAN

In addition to using Auto VLAN in certificates, you can also use this feature in the following areas of the Cloudpath UI:

- Legacy DPSK - From within a workflow, insert a step: **Generate a Ruckus DPSK > Store DPSKs in a controller (Legacy) > A new DPSK configuration**, "VLAN ID" field
- MAC Registrations - From the UI: **Configuration > MAC Registrations > Add MAC Registration**, "Authentication Attributes" section; add the following three Success Reply Attributes:
  - Tunnel-Private-Group-Id (string) - Set this attribute to the variable `#{VLAN_POOL_ASSIGNMENT}`
  - Tunnel-Type (integer) - Set this value appropriately for your system.
  - Tunnel-Medium-Type (integer) - Set this value appropriately for your system.

## Publishing the Enrollment Workflow

A workflow is published using Snapshots. A snapshot is a version of a workflow configuration. You can create and maintain multiple versions of each configuration. However, only one snapshot can be active at a time for each workflow.

The Workflow list contains status of the workflow (published or unpublished), the **Enrollment Portal URL** where a configuration is deployed, and the last published time for each workflow configuration.

FIGURE 53 Publish Workflows

The screenshot displays the 'Configuration > Workflows' interface. At the top right, there is an 'Add Workflow' button. Below it is a table listing various workflows with their status, enrollment portal URLs, and last published times.

Workflows	Status	Enrollment Portal URL	Last Publish Time
Building A Lobby with Guest Access	Unpublished	/enroll/Regression/BLDG-A-Lobby/	
BLDG B Employee Access	Unpublished	/enroll/Regression/SponsoredGuest-JR/	
Richard_Test	Published	/enroll/Regression/Richard/U/	20170413 1715 GMT
Sponsored Guest JR	Published	/enroll/Regression/Sponsored-Guest-JR/	20170413 1715 GMT
Employees with Personal Devices BYOD	Unpublished	/enroll/Regression/EmployeeswithPersonalDevicesBYOD/	
Employee IT Asset	Published	/enroll/Regression/Employee/ITAsset/	20170413 1715 GMT
Primary Workflow	Published	/enroll/Regression/Production/	20170413 1715 GMT

Below the table, there are tabs for 'Properties', 'Enrollment Process', 'Look & Feel', 'Snapshot(s)', and 'Advanced'. The 'Enrollment Process' tab is selected, showing a sequence of steps:

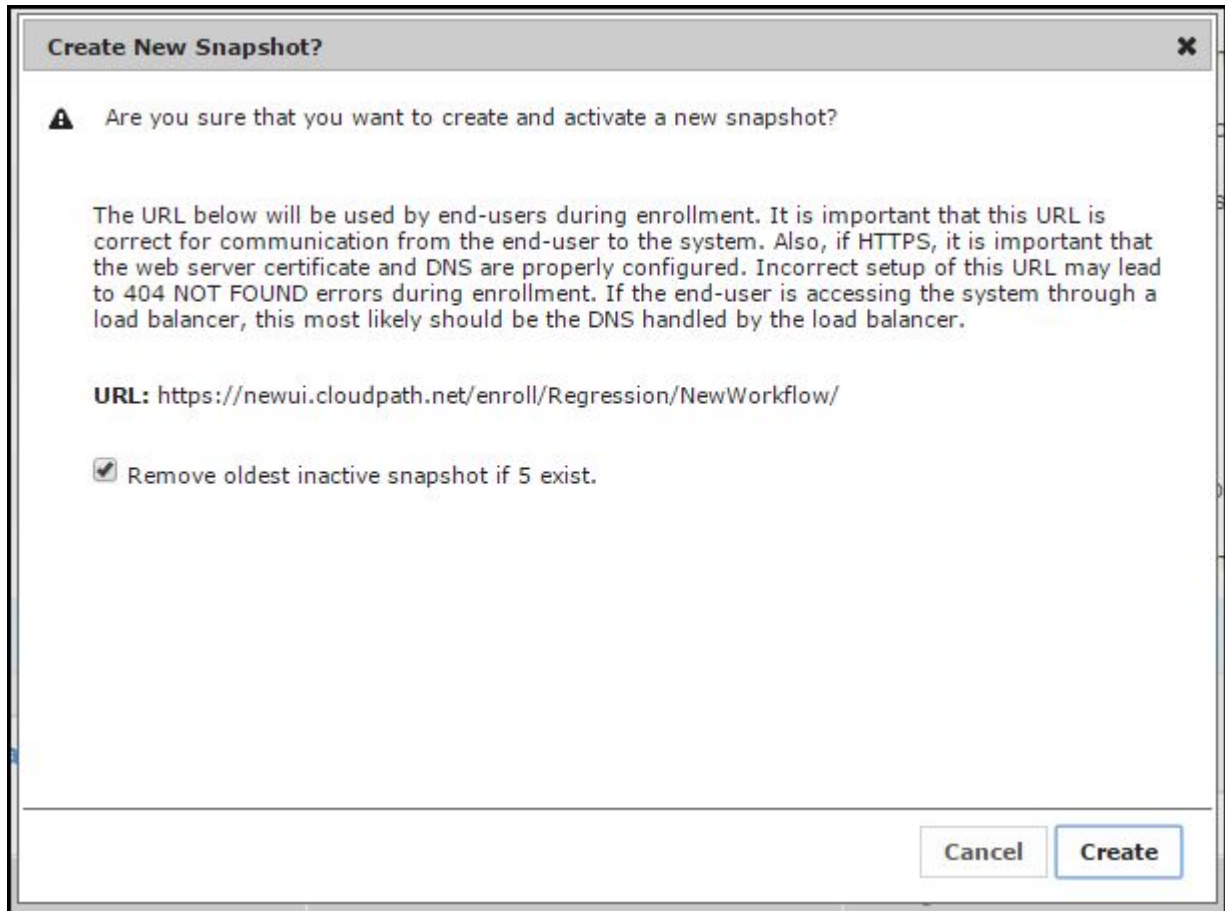
- Step 1: Require the user to accept the AUP **Welcome Message and AUP**
- Step 2: All matches in: **Your Device**, Company Devices +
- Step 3: **Prompt the user** for credentials from **Test AD**
- Step 4: All matches in: **Your Device**, Company Devices +
- Result: **Assign** a device configuration and/or certificate.

When you publish a workflow, this creates a snapshot of the workflow configuration. To publish the workflow:

1. Navigate to **Configuration > Workflows** tab.

2. On the Workflow configuration page, click the **Publish** icon next to the workflow to publish.

**FIGURE 54** Create New Snapshot



3. Select the Wizard version to use for the new snapshot. The **Cloudpath Wizard** is the application provided to users to automate the enrollment process.
4. Verify the Enrollment Portal URL for the snapshot.
5. Click **Create**.

It takes a few minutes to build the deployment package. During this process, all Cloudpath workflow branches are pulled in by the Cloudpath system and bundled as one configuration.

## How to Test a Published Workflow

Test the enrollment process for the active workflow snapshot using the Enrollment Portal URL. The Enrollment Portal URL provides access to the user enrollment process, which contains the workflow and if applicable, the Cloudpath Wizard.

1. Navigate to the **Configuration > Workflows** page.
2. On the workflow list, select the workflow to test.
3. Click the Enrollment Portal URL. Be sure that the snapshot you want to test is the **active** snapshot (green icon).



# Administration

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## Administration Overview

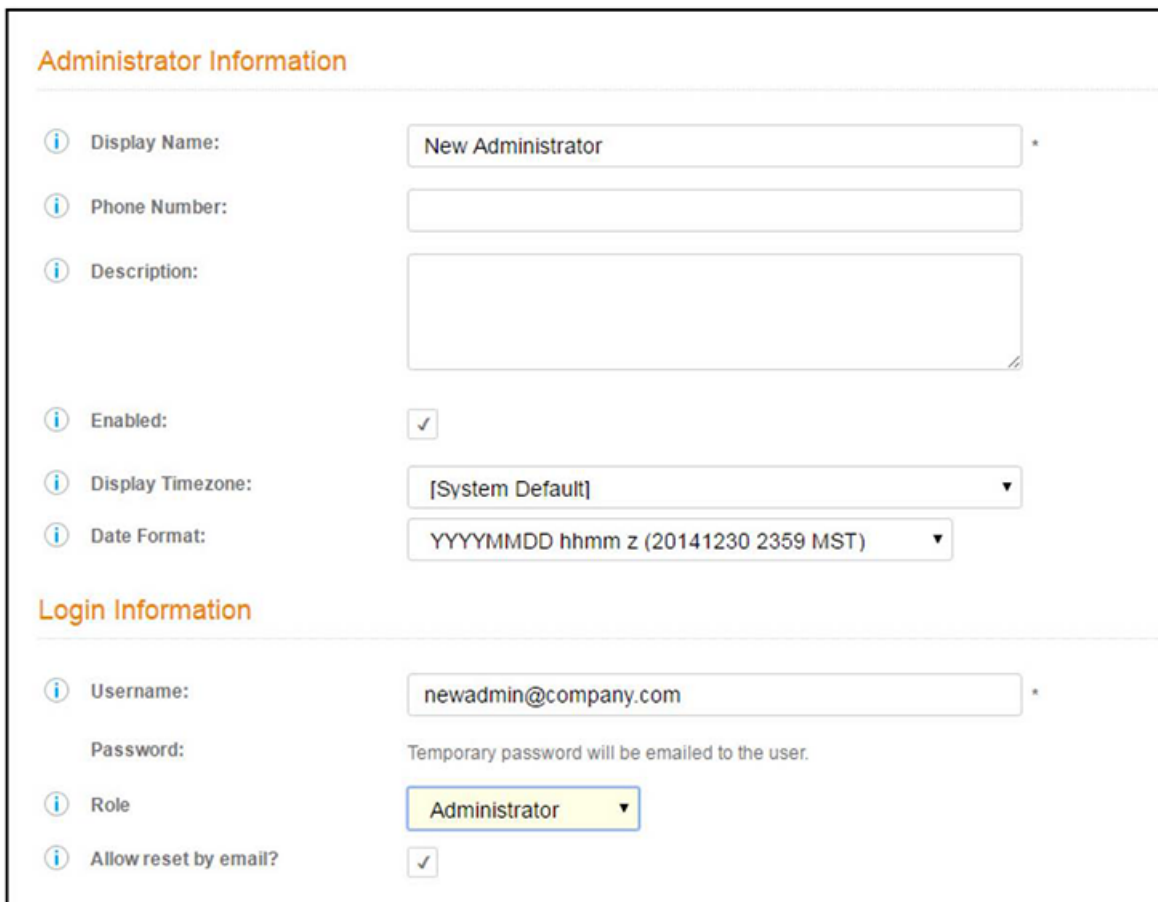
Access the **Cloudpath Administration** tab to manage system-related operations, using links in the following sections:

### Administrators

During the initial account setup, Cloudpath sets up an administrator account using the company information provided during the setup. By default, there is also an Administrator Group, which allows administrative access to the Admin UI using credentials from the configured authentication server. This allows users who belong to a specific group to access Cloudpath.

Manage administrator access to the Cloudpath Admin UI from **Administration > Administrators**.

**FIGURE 55** Add Administrator



**Administrator Information**

**Display Name:** New Administrator \*

**Phone Number:**

**Description:**

**Enabled:**

**Display Timezone:** [System Default] ▼

**Date Format:** YYYYMMDD hhmm z (20141230 2359 MST) ▼

**Login Information**

**Username:** newadmin@company.com \*

**Password:** Temporary password will be emailed to the user.

**Role:** Administrator ▼

**Allow reset by email?:**

Cloudpath supports the following Administrator Roles:

- CA Administrator - Allows full configuration access to the Administrative UI. This administrator role can manage all administrative users.
- Administrator - Allows full configuration access to the Administrative UI, except for Certificate Authorities. This administrator can manage Administrator and Viewer administrative users.
- Viewer - Allows view-only access to Enrollment, User, and Certificate records on the Dashboard, the enrollment Workflow, and the Documentation and Licensing pages. This administrator cannot manage other administrative users.

## Company Information

Company Information - Used within the URL for enrollments and sponsorships, and included in the onboard CAs.

## System Services

Navigate to **Administration > System Services** to restart or view logs for the application server, web server, configure email or SMS servers, or start up a support tunnel.

**FIGURE 56** Cloudpath System Services

Administration > System Services		
>	Service: Web Server	
>	Service: Network	
>	Service: SSH	
>	Service: Support Tunnel	
>	Service: Outbound Email	
>	Service: Outbound SMS	
>	Service: Logs	
>	Service: External Reporting Server	
>	Service: Virtual Machine	
>	Service: Alexa	
>	Service: Auto VLAN Assignment	

- Web Server - Download the Apache Server access and error logs from the Web Server component. You can also Restart the web server, generate a CSR, edit administrative access restrictions, and download or upload the web server certificate, or if needed, upload a code certificate.

- Network - The **Network** service displays network properties for Cloudpath, and provides access to view or download the diagnostic logs.
- SSH - Use the **SSH** service to enable, disable or change the access port. SSH runs on ports 22 and 8022. You can set the port number using the command line or from the user interface. Even if you disable SSH access for both ports, SSH can continue to run.
- Support Tunnel - The **Support Tunnel** service allows you to open a support tunnel to help you in diagnosing issues with your application or configuration.
- Outbound Email - Use the onboard email provider or configure a local email server.
- Outbound SMS - Use the onboard SMS provider, enter a CDYNE account or route SMS message through a customer-owned account.
- Logs - Configure where syslog messages are sent. You can enable the syslog, select the protocol over which the syslog messages are sent, and enter a host and port number.
- External Reporting Server - Allows you to integrate Cloudpath enrollment data with a reporting server, such as the ELK stack (Elasticsearch, Logstash, and Kibana).
- Virtual Machine - Displays the system clock and system information about the virtual machine. You can also reboot or shut down the virtual machine from this page.
- Alexa - Allows you to bind or unbind Alexa, remove old binding data, or get Alexa log files.
- Auto VLAN Assignment - Allows you assign available VLAN IDs from a configured range of VLANs to users during their enrollment.

## System Updates

System Updates - View and manage the Cloudpath build versions.

## Data Cleanup

Data Cleanup - Manage database cleanup thresholds for enrollment records, abandoned certificates, vouchers, notifications, manage wizard versions, and other system events.

## Firewall Requirements

Firewall Requirements - Displays inbound and outbound traffic from Cloudpath to assist with firewall configuration.





# Configuration

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## Overview

The components listed in the **Configuration** tab are described in the following sections. They are typically set up during the Initial System Setup, or during the workflow configuration, but can be modified as needed.

The Workflow tab is covered in [#unique\\_48](#).

## Device Configurations

A device configuration is a group of configuration settings for a specified WLAN or wired network. Device Configuration settings are managed using the following tabs:

- Summary tab - An overview of the device configuration settings.
- Networks tab - WLAN settings.
- Trust tab - RADIUS server information and certificate chaining.
- OS Settings tab - User experience, network, and additional settings that are specific to an operating system or a specific version of an operating system.
- Passpoint tab - Passpoint settings for the device configuration, which includes certificate settings, and home service provider, subscriber, and policy settings.

Refer to the *Configuring Cloudpath to Support Hotspot 2.0 Release 2 (Passpoint)* guide on the **Admin UI Support** tab for complete details on setting up a Ruckus SmartZone controller and Cloudpath for Passpoint.

- Credentials tab - (For PEAP networks only) Settings related to password-based Wi-Fi.

## RADIUS Server

View and manage the onboard RADIUS server.

- RADIUS Server Status - View status, settings, and certificate information, generate a CSR, or upload a certificate. You can also download RADIUS server certificates and log files or export onboard CA information to be used to set up an external RADIUS server.
  - Connection Tracking - Enabled by default on new systems, Connection Tracking displays the current device connections on the **Dashboard > Connections** page. RADIUS Accounting must be enabled on your wireless LAN controller. See the *Integration with Ruckus Controllers* guide on the **Support** tab for more information.

- CoA - Enable CoA to send Change of Authorization disconnect messages (DMs) from Cloudpath to the switch or wireless LAN controller. You can send disconnects from the **Dashboard > Connections** page, or via an enrollment **Revoke**. See the *Onboard RADIUS Server CoA guide* on the **Support** tab for more information.
- Policies - View all policies for the onboard RADIUS server, including those assigned by certificate templates, eduroam configuration, and MAC registration policies.
- Clients - View all RADIUS allowed to call into the RADIUS server, including any eduroam clients.
- RADIUS Server and eduroam - Configure a eduroam federation server to interact with the onboard RADIUS server.
- Attributes - Define the RADIUS attributes that will be visible in the system. These attributes, which are included in the Access-Accept/Reject reply from the RADIUS server, can be added to the certificate template, MAC registration, and eduroam configuration.
- External - Download a zip file, which provides the information and CA certificate needed for an external RADIUS server.
- Open Access - Configure open access for a specific SSID, for a specified time-period for short term usage.

**NOTE**

We recommend using Open Access in a limited, or test environment. SSIDs configured for Open Access are not secure.

- RADIUS Accounting - If your wireless LAN controller is configured to support RADIUS accounting, and if Connection Tracking is enabled, the Accounting tab displays RADIUS accounting packets local to the Cloudpath server. See the *Integration with Ruckus Controllers* guide on the **Support** tab for more information.

**FIGURE 57** RADIUS Accounting

The screenshot shows the 'Accounting' tab in the Cloudpath interface. The title is 'Recent RADIUS Accounting Packets (Local)'. The table below contains the following data:

Event Timestamp	Type	Session ID	Calling Station	Client IP	Username	NAS ID	NAS IP	NAS Port
Dec 14 2016 13:42:24 WST	Start	999CBAD1-00001769	4C:00:78:8F:1A:18	192.168.95.201	anna@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	59
Dec 14 2016 13:43:52 WST	Start	999CBAD1-00001769	6A:FE:9C:67:87:AD	192.168.95.201	bob@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	59
Dec 14 2016 13:44:24 WST	Start	999CBAD1-00001769	3d:84:a8:08:C8:F9	192.168.95.200	jack@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	60
Dec 14 2016 13:47:04 WST	Start	999CBAD1-00001769	4C:00:78:8F:1A:18	192.168.95.187	l@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	61
Dec 14 2016 13:47:17 WST	Start	999CBAD1-00001769	3d:0C:0F:21:8D:AD	192.168.95.138	mike@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	63
Dec 14 2016 13:50:14 WST	Start	999CBAD1-00001769	3C:A9:F4:01:02:50	192.168.95.40	anna@tst.companys.com	6C:AA:8D:54:AF:8C	192.168.92.143	1
Dec 14 2016 13:52:24 WST	Start/stop/Start	999CBAD1-00001769	4C:00:78:8F:1A:18	192.168.95.201	anna@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	59
Dec 14 2016 13:53:02 WST	Start/stop/Start	999CBAD1-00001769	6A:FE:9C:67:87:AD	192.168.95.201	bob@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	59
Dec 14 2016 13:53:49 WST	Start	999CBAD1-00001769	8C:3A:83:19:4D:0A	192.168.95.209	bob@tst.companys.com	6C:AA:8D:54:AF:8C	192.168.92.143	1
Dec 14 2016 13:54:34 WST	Start/stop/Start	999CBAD1-00001769	3d:84:a8:08:C8:F9	192.168.95.135	jack@tst.companys.com	38-FF:34-02-6A-7E	192.168.92.135	60

## Authentication Servers

View and manage the servers against which users may be authenticated. This includes local servers such as Active Directory and LDAP, as well as third-party services, such as Facebook, SAML (Shibboleth), RADIUS via PAP, and an onboard database.

## Firewalls and Web Filter Integration

Configure Cloudpath to integrate with Palo Alto Firewalls and Web Filter applications.

Cloudpath supplements data already captured by these applications by adding mappings of the IP address to a UserId, which allows the captured traffic to be identifiable. When the user joins the network via Cloudpath, the firewall or web filter application is notified of the user's login. Similarly, when a user is known to have left the network, the application is notified of the logout.

## MAC Registration Lists

View and manage MAC registration databases, which allow network access to devices that do not have the 802.1X supplicant capability.

Each database has its own policies. When a device is registered, it is assigned to one of the databases. Cloudpath provides a template for importing MAC address in bulk using a .csv or .xlsx file.

## API Keys

A list of the APIs currently in use with Cloudpath.

The REST APIs allow the system to actively notify external systems and to be queried and manipulated by external systems.



# Dashboard

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## Overview

The Cloudpath dashboard provides detailed information about the number and status of enrollments on your network, including notifications, events, certificates, MAC registrations, and scheduled reports.

## Enrollments

The **Enrollments** table allows you to review enrollments, including the associated user, device, and certificate information. The **Enrollment Paths** tab shows a graphical depiction of the different paths taken by users during the enrollment process.

FIGURE 58 Enrollments Table

ID	Status	Enrollment Type	User	Device	Certificate	Created	Expires	Renewed	Revoked	Deleted
7081	Completed	Certificate Enroll	bob	Windows 8	Windows 8	03/13/2018 17:58:45PT				
4389	Completed	Certificate Enroll	bob	Windows 8	Windows 8	03/13/2018 18:28:53PT				
4754	Completed	Certificate Enroll	bob	Chrome OS	Chrome OS	03/13/2018 18:28:53PT				
4768	Completed	Certificate Enroll	bob	Chrome OS	Chrome OS	03/13/2018 18:28:53PT				
5887	Completed	Certificate Enroll	bob	Windows 10	Windows 10	03/13/2018 18:40:53PT				
4878	Completed	Certificate Enroll	bob	Ubuntu	Ubuntu	03/13/2018 18:40:53PT				
5478	Completed	Certificate Enroll	bob	Ubuntu	Ubuntu	03/13/2018 18:27:45PT				
8104	Completed	Certificate Enroll	bob	Ubuntu	Ubuntu	03/13/2018 18:27:45PT				
4420	Completed	Certificate Enroll	bob	Android 7.1	Android 7.1	03/13/2018 18:27:45PT				
4353	Completed	Certificate Enroll	bob	Android 7.1	Android 7.1	03/13/2018 18:27:45PT				
7128	Completed	Certificate Enroll	bob	Android 6.0	Android 6.0	03/13/2018 18:27:45PT				
4759	Completed	Certificate Enroll	bob	Android 6.0	Android 6.0	03/13/2018 18:27:45PT				
4888	Completed	Certificate Enroll	bob	Android 6.0	Android 6.0	03/13/2018 18:27:45PT				
4614	Completed	Certificate Enroll	bob	Windows 10	Windows 10	03/13/2018 18:26:51PT				
5884	Completed	Certificate Enroll	bob	Windows 10	Windows 10	03/13/2018 18:26:51PT				

**NOTE**

Use the view icon to display further details about a specific enrollment record, to revoke a certificate, or to remove the enrollment record from the database.

## Records Export

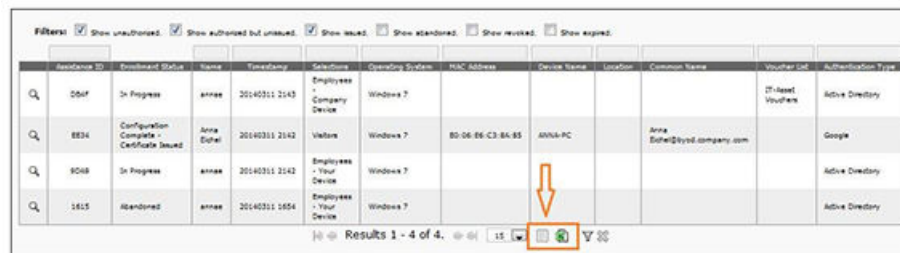
Enrollment and User data can be downloaded, as a CSV file or Microsoft Excel spreadsheet.

Use the CSV Export icon  or XLS Export icon  located at the bottom of the table.

By default, the Enrollment data files are named **enrollments.txt** or **enrollment.xls** and the User data files are named **users.txt** or **users.xls**.

The Enrollment and User export files are designed to be a quick view of the activity since midnight. To export only certain items in the table, for a specific date and time, or to export items for a longer time period, see *Scheduled Reports*.

**FIGURE 59** Download Enrollment Records



The screenshot shows a table with columns: Enrollment ID, Enrollment Status, Name, Timestamp, Category, Operating System, MAC Address, Device Name, Location, Company Name, User ID, and Authentication Type. There are four rows of data. At the bottom of the table, there is a pagination bar showing 'Results 1 - 4 of 4.' and a download icon (a green circle with a white document symbol) which is highlighted with an orange box. An orange arrow points down to this icon.

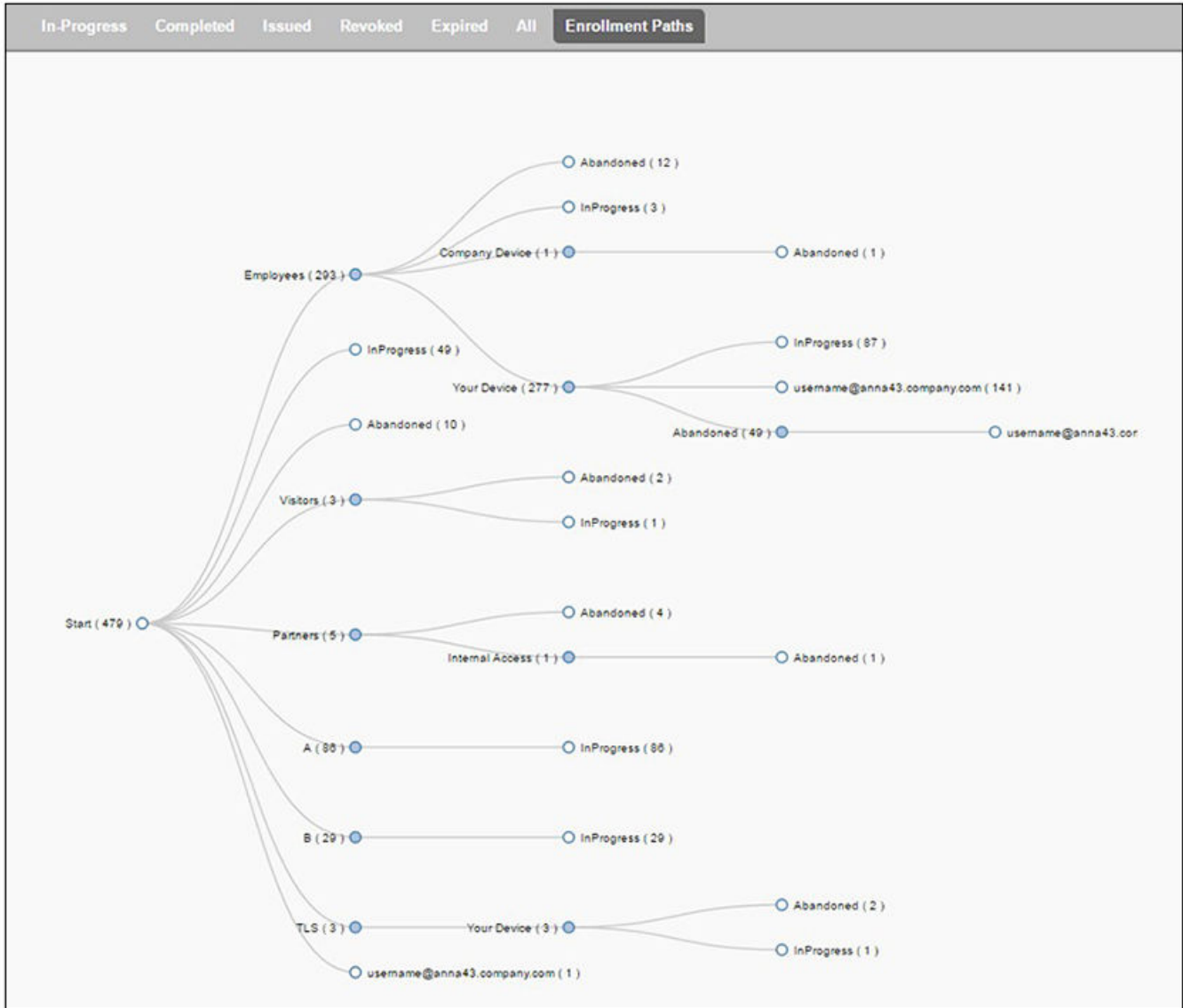
Enrollment ID	Enrollment Status	Name	Timestamp	Category	Operating System	MAC Address	Device Name	Location	Company Name	User ID	Authentication Type
004F	In Progress	anna	20140311 2143	Employees - Company Device	Windows 7					IT Asset YouFem	Active Directory
8E34	Configuration Complete - Certificate Issued	Anna Eitel	20140311 2142	Victims	Windows 7	80-06-06-C3-8A-85	ANNA-PC		Anna Eitel@byod.company.com		Google
9048	In Progress	anna	20140311 2142	Employees - Your Device	Windows 7						Active Directory
1615	Abandoned	anna	20140311 1804	Employees - Your Device	Windows 7						Active Directory

## Enrollment Paths

During enrollment, the user is taken through a sequence of steps, called an enrollment workflow. The workflow depends on the selection chosen when the user is prompted, and on any configured filter in the workflow. For example, the user can select the Employee or Guest path, and then be moved to the IT Asset device path, because their Active Directory credentials, by way of a filter, caused them be moved to the Personal Device path.

The **Enrollment Paths** tab shows a graphical depiction of the paths taken by users during the enrollment process.

FIGURE 60 Enrollment Path



## Connections

The **Connections** tab displays the current device connections for the Cloudpath system. To view the connections, **RADIUS Accounting** must be enabled on your wireless LAN controller and **Connection Tracking** must be enabled for the onboard RADIUS server. See the *Cloudpath Enrollment System Integration with Ruckus WLAN Controllers Configuration Guide* for more information.

**FIGURE 61** RADIUS Connections

		Status	IP Address	MAC Address	Username	SSID	Duration
Q X	+	Connected	192.168.95.136	04:0C:CE:21:8D:A0	mike@byod.company.com	eng-Anna42	10 minutes ago
Q X	+	Connected	192.168.95.40	3C:A9:F4:01:02:50	anna@byod.company.com	eng-Anna42	7 minutes ago
Q X	+	Connected	192.168.95.197	6C:94:F8:B9:DB:06	bill@byod.company.com	eng-Anna42	11 minutes ago
Q X	+	Connected	192.168.95.195	34:E6:AD:0E:CE:F5	jack@byod.company.com	eng-Anna42	13 minutes ago
Q X	+	Connected	192.168.95.251	E4:F8:9C:07:B7:4D	bob@byod.company.com	eng-Anna42	15 minutes ago
Q X	+	Connected	192.168.95.181	4C:8D:79:E9:16:18	anna@byod.company.com	eng-Anna42	16 minutes ago
Q X	+	Connected	192.168.95.209	8C:3A:E3:15:6C:C6	bob@byod.company.com	eng-Anna42	4 minutes ago

You can send Change of Authorization (CoA) disconnect messages (DMs) to the controller or switch from the **Connections** page, or via an enrollment **Revoke**. See the *Onboard RADIUS Server CoA* guide on the **Documentation** tab for more information.

## Users & Devices

The **Users** table provides a list of User records, including user devices, enrollment paths, and certificate information for each user.

**FIGURE 62** User Table

		Status	Photo	First Name	Last Name	Server Name	Authentication Type	Timestamp
Q				Anna	Eichel	LinkedIn, Facebook, or Gmail	Google	20140326 1006 MDT
Q				Anna	Eichel	Anna Test AD	Active Directory	20140326 1335 MDT
Q				Bob	Johson	Anna Test AD	Active Directory	20140326 1344 MDT
Q				Bill	Smith	Anna Test AD	Active Directory	20140326 1348 MDT
Q				Mark	Test	Anna Test AD	Active Directory	20140326 1415 MDT
Q				Lynn	Test	Anna Test AD	Active Directory	20140326 1415 MDT
Q				Mike	Test	Anna Test AD	Active Directory	20140331 1622 MDT
Q				Anna	Test	Anna Test AD	Active Directory	20140331 1625 MDT
Q				Anna	Eichel	LinkedIn, Facebook, or Gmail	Google	20140331 1638 MDT

**NOTE**

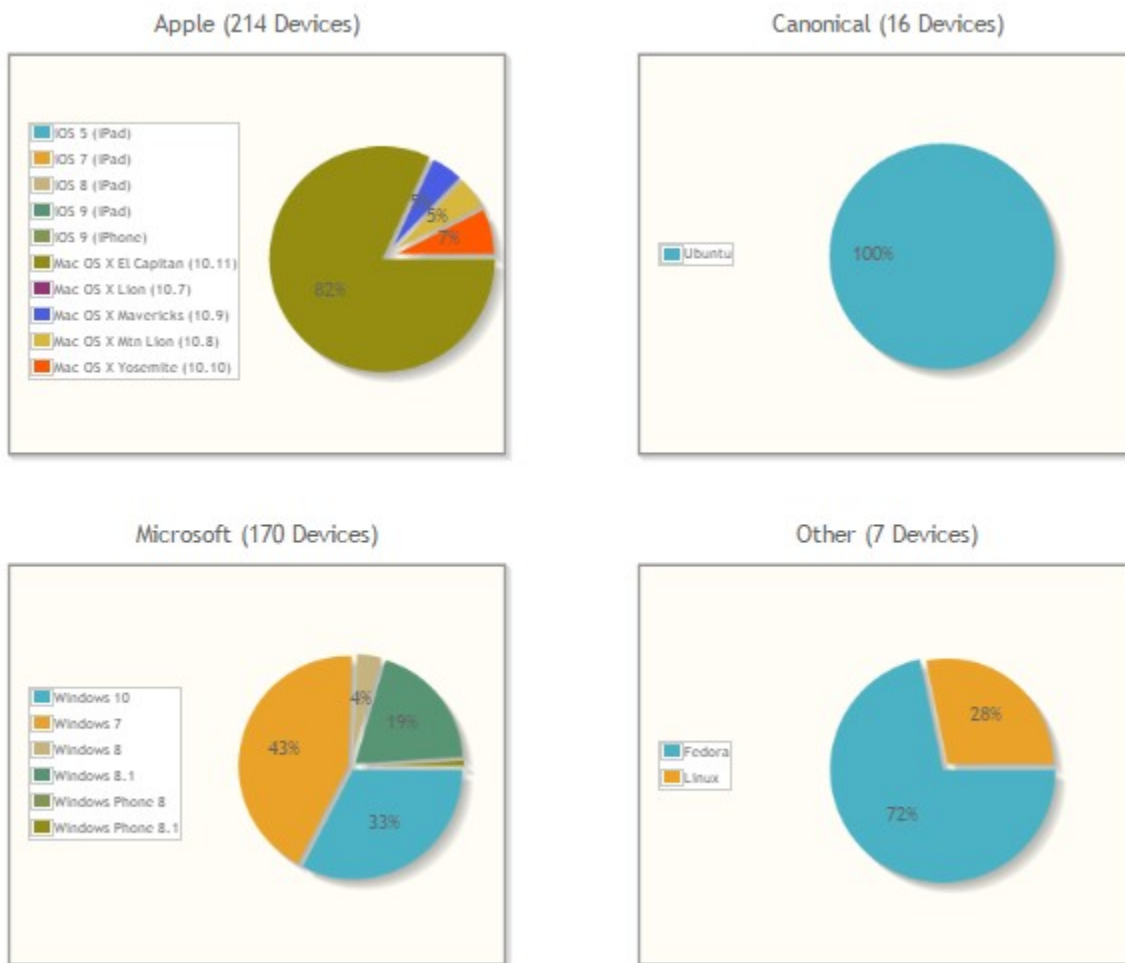
Use the view icon to display further details about a specific user record, to block the user, or to remove the user record from the database.

## Device Types

The device type information is obtained from user-agent during the initial enrollment attempt. The device types graphs show the enrollments by operating system.



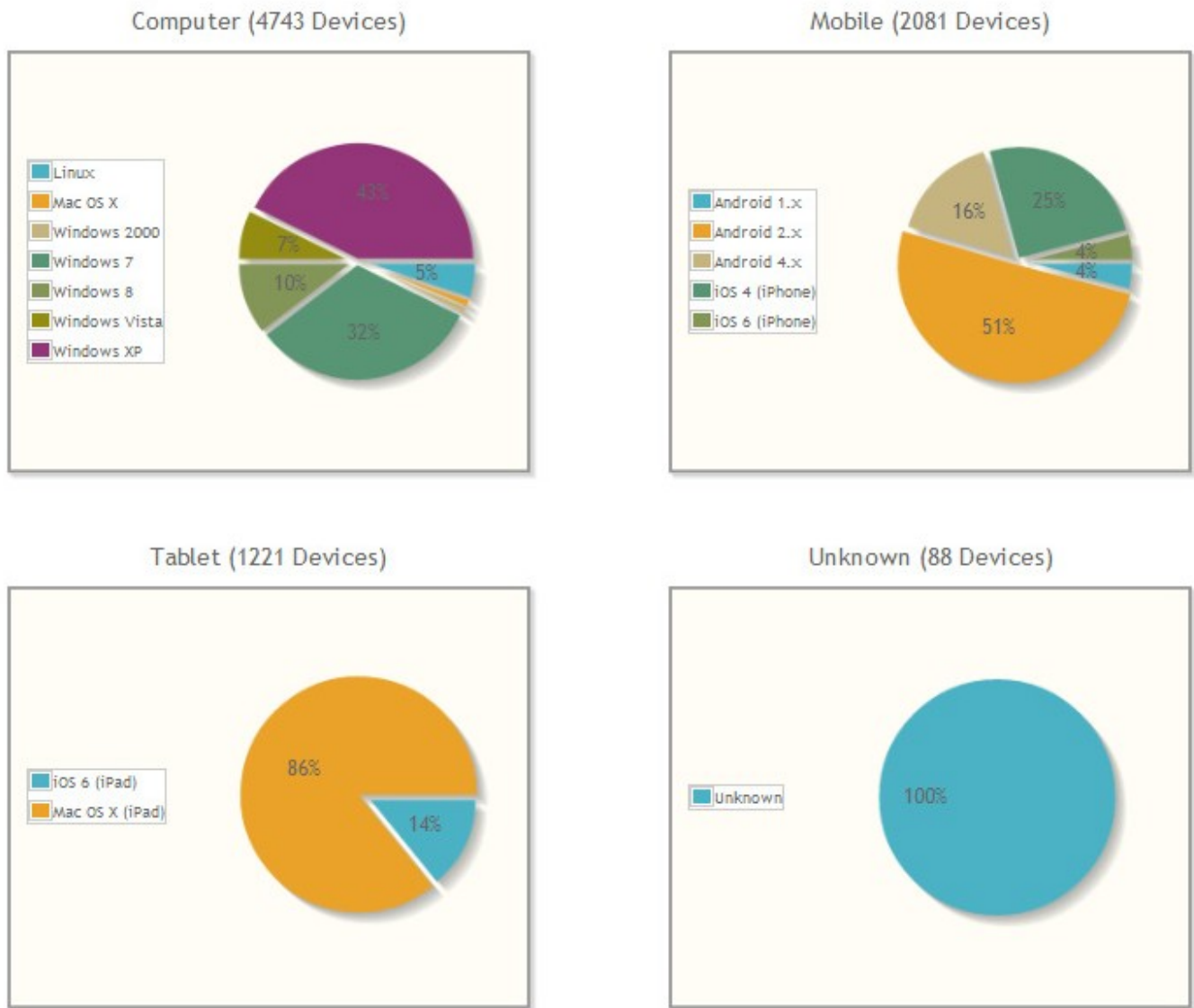
**FIGURE 63 Device Types**



## Form Factors

The form factor is obtained from the device user-agent during the initial enrollment attempt. The form factor graph displays the device type, such as computer, tablet, or mobile phone.

**FIGURE 64** Device Form Factors



## MAC Registrations

The **MAC Registration** table displays all devices that have been registered using the MAC address instead of being enrolled using a certificate.

## Certificates

Cloudpath issues client certificates to users based on the templates set up for specific users and devices. Server certificates can be issued for the RADIUS server, web server, or other external server in your network. The active certificates graph displays, by date, the number of active (not expired) client and server certificates, and from which template they were issued

## Certificates Table

The Certificates table lists all server and client certificates issued by the onboard CA. Use the **Active**, **Revoked**, **Expired**, and **All** tabs to filter the data in the table.

FIGURE 65 Certificates Table

Search	Status	Contact Name	Issuance	Expiration Date	CA Name	Template	Email	Revocation Code	Type/Name	Exp/Chg/Down
Q X	●	mark@byod.company.com	20140402 1056 MDT	20150402	Anna Test Intermediate CA 1	username@byod.company.com			52CD...6610	20140402 1056 MDT
Q X	●	anna@byod.company.com	20140402 1054 MDT	20150403	Anna Test Intermediate CA 1	username@byod.company.com			18CC...1827	20140402 1054 MDT
Q X	●	anna@byod.company.com	20140401 1415 MDT	20150401	Anna Test Intermediate CA 1	username@byod.company.com			AAS1...E2DA	20140401 1415 MDT
Q X	●	lynn@byod.company.com	20140401 1402 MDT	20150401	Anna Test Intermediate CA 1	username@byod.company.com			D472...768D	20140401 1402 MDT
Q X	●	bill@byod.company.com	20140401 1351 MDT	20150401	Anna Test Intermediate CA 1	username@byod.company.com			EC14...1554	20140401 1351 MDT
Q X	●	AnnaTest.cloudpath.net	20140401 1342 MDT	20170401	Anna Test Root CA 1	Server-Templates	it@company.com		82D4...43E1	20140401 1342 MDT

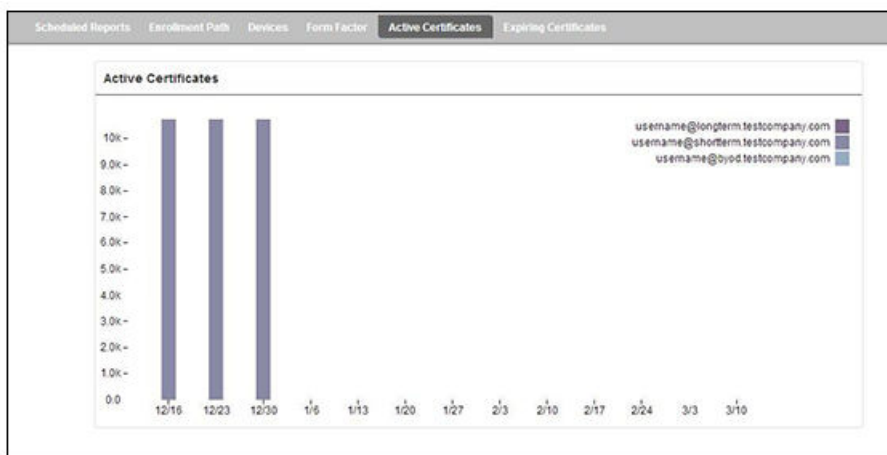
**NOTE**

Use the view icon to display further details about a specific certificate record, to disable or revoke the certificate, to download the certificate, or to remove the user record from the database.

## Active Trends

The **Active Certificates** graph displays, by date, the number of active (not expired) client and server certificates, and from which template they were issued.

FIGURE 66 Active Certificates



## Expiring Trends

The validity period of certificates issued by Cloudpath is derived from the certificate template used when the certificate was issued. The **Expiring Certificates** graph displays, by date, the number of client and server certificates that are about to expire, and from which template they were issued.

**FIGURE 67** Expiring Certificates



## Notifications

The **Notifications** tab allows you to review emails and SMS messages, event logs, and schedule reports.

### Notification Records

The **Notifications** table displays email and SMS notifications that have been sent by the system. The system logs email and SMS notifications sent for sponsors, messages for vouchers, network access, and certificate issuance or revocation.

**FIGURE 68** Notifications Table

Type	Address	Last Known Status	Timestamp	Email Subject
EMAIL	anna@cloudpath.net	Email sent.	20140401 0913 MDT	Verification Code for Network Access
EMAIL	anna@cloudpath.net	Email sent.	20140401 0841 MDT	text notification

## Events

The **Events** log displays all system events, such as account logins, enrollments, acceptance of AUPs, registrations, certificate issuance, errors, account updates, and snapshot creation.

### Schedule Reports

The scheduled report feature allows you to schedule a task to export enrollment record data, by date, or schedule a recurring export. For example, you might schedule an enrollment data report to occur on a weekly, or daily basis. This report can be emailed to one or multiple email addresses.

You can schedule multiple reports. For example, you can create a report that emails an enrollment record report based on enrollments with revoked certificates, and another based on issued certificates.

To schedule a task:

1. Go to **Dashboard > Notifications > Scheduled Reports**.
2. On the **Scheduled Reports** page, click **Add Scheduled Report**.

**FIGURE 69** Schedule Enrollment Records Export

3. On the **Modify Scheduled Report** page, enter the **Name**, **Description**, **Email Address** and **Subject** for the recipient of the enrollment records report. You can enter multiple email addresses, separated by commas.
4. Specify when task is to be run. The execution period can be a specific date or you can set up a recurring report to be emailed daily, weekly, or monthly.
5. In the **Enrollment Status To Include** section, check the information to be included in the report. For example, select **Certificate Issued** and **Enrollment Complete** to create a report that shows the number of devices that have successfully onboard to the network.
6. Specify the **Report Content**, which determines the data columns that will be included in the report.
7. **Save** the scheduled task.

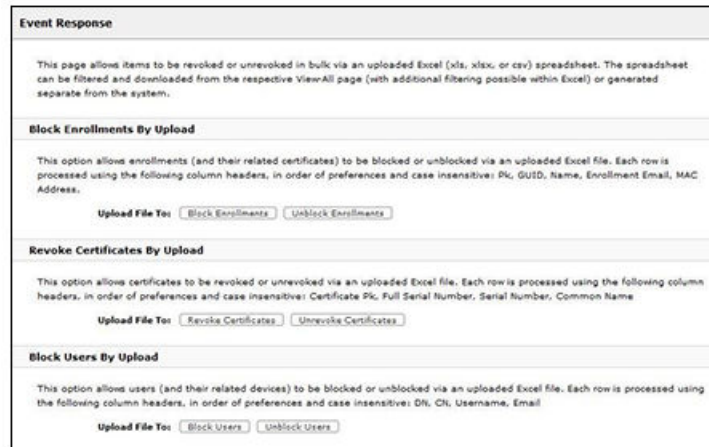
**FIGURE 70** Scheduled Report

The enrollment record data is emailed, as a CSV file, to the specified address, at the scheduled frequency. You can also download an interim report from this page.

# Event Response

Use the **Event Response** page to block a large number of enrollments or users, or revoke certificates in bulk using information in an uploaded Excel (xls or xlsx) spreadsheet.

**FIGURE 71** Event Response



The Excel spreadsheet, which is a file of enrollment records, can be filtered and downloaded from the **Dashboard > Enrollments** (or Certificates) page, allows you block/unblock users or enrollments, or revoke/unrevoke certificates.

# Support

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## Overview

The **Support** tab provides links to technical documentation, information related to product licensing and statistics, diagnostics, and a process for uploading a support file, if needed.

## Documentation

The **Documentation** page contains technical documents for getting the system set up, integration with other systems, managing the system, and special configuration instructions. This page also provides links to the most commonly used pages in the Cloudpath Admin UI.

## Licensing

The **Licensing** page displays information about the type and number of Cloudpath licenses, active certificates, usage statistics, and copyright notices.

**FIGURE 72** Licensing Information Page

The screenshot displays a web interface for licensing information, organized into four main sections:

- License Information:** Shows licensee 'Jeff Test', license type 'Subscription' (active through 20200915), customer ID 'XPC-CPN-00114', support link 'https://support.ruckuswireless.com/', and a 'Contact Sales' button.
- System Utilization:** Shows 1 total user license and 1 consumed. Active certificates include 2 currently active, with breakdowns by issuance period (Last 30, 60, 90 days, and Last Year). AD/LDAP users: 1 total; Email count: 1 in last 90 days.
- License Server:** Shows server URL 'https://bvt.cloudpath.net', link established 'Yes, since 20190807 0858 MDT' (Advanced), customer GUID, and system identifier.
- Notices:** Includes Open Source Notices (pointing to http://www.cloudpath.net/opensource and http://www.apache.org/), Patent Notice (listing patents 9,032,499, 9,003,507, 9,137,234, 9,137,235, 8,843,741, 9,037,849), and Copyright Notice (© Ruckus, an ARRIS Company 2019).

### What Happens If More Licenses Are Being Consumed Than Have Been Allocated?

Licenses are counted as follows:

- Each active user consumes one license, no matter how many devices are linked to a specific user account.
- Each active device where no user is linked to that device also consumes one license.

The following Licensing Information page shows an example of the number of total user licenses consumed exceeding the number of total user licenses for an existing Cloudpath system:



**FIGURE 73** Example of Total User Licenses Consumed Exceeding Limit

System Utilization	
<b>Total User Licenses:</b>	30 users
<b>Total User Licenses Consumed:</b>	50 users
<b>Active Certificates:</b>	104 Currently Active
	104 Issued In Last 30 Days
	104 Issued In Last 60 Days
	104 Issued In Last 90 Days
	104 Issued In Last Year
<b>AD/LDAP Users:</b>	50 Total
<b>Email Count:</b>	5 In Last 90 Days

When this situation occurs, the account is flagged at midnight, and you receive an email notification. The next time you log in to your Cloudpath system, a banner indicating that the license consumption has exceeded the maximum number of allowed licenses will appear, and the email that was sent will also appear in your Notifications (see the two figures below). The banner continues to appear, followed by monthly email notifications, until the situation has been resolved with your Cloudpath support representative. Once the situation has been resolved, the banner will be removed the next day, and monthly email notifications will no longer be sent.

FIGURE 74 License-Consumption Banner on Welcome Page When Consumption Exceeds Limit

The screenshot displays the Cloudpath Enrollment System interface. At the top left is the logo for 'CLOUDPATH ENROLLMENT SYSTEM'. A dark sidebar on the left contains a navigation menu with items: Dashboard, Welcome, Connections, Enrollments, DPSKs, Users & Devices, Certificates, Notifications, Event Response, Configuration, Sponsorship, Certificate Authority, Administration, and Support. The main content area features a red warning banner at the top that reads: 'License consumption exceeded. Please reach out to your Ruckus representative for additional licenses.' Below the banner, the 'Welcome to the Cloudpath ES' section contains introductory text and a 'Getting Started' section with instructions on how to use the dashboard tabs. A network diagram on the right illustrates the system's architecture, showing an Onboarding Network connected to a central device (Cloudpath ES) which is connected to a LAN (Wired Network) and a WLAN (Wireless Network). The WLAN is connected to a Secure Network. The central device also has connections for HTTP, HTTPS, and RADIUS. A box on the right side of the diagram shows a list of supported devices: iPhone, iPad, and Android.

**License consumption exceeded.** Please reach out to your Ruckus representative for additional licenses.

### Welcome to the Cloudpath ES

Cloudpath ES provides a single point-of-entry for devices entering the network environment. The Automated Device Enablement (ADE) approach gives network administrators control by blending traditional employee-centric capabilities (Active Directory, LDAP, RADIUS, and Integration with Microsoft CA) with guest-centric capabilities (sponsorship, email, SMS, Facebook, and more).

#### Getting Started

Use the left menu tabs to begin setting up your workflow configuration. The **Dashboard** tab displays reporting information about the enrollments, users, devices, certificates, and more.

The **Configuration** tab allows you to configure and deploy the enrollment workflow, including the look & feel and the device configuration.

From the **Sponsorship** tab, you can manage vouchers and voucher lists, and customize the look & feel of the sponsorship portal.

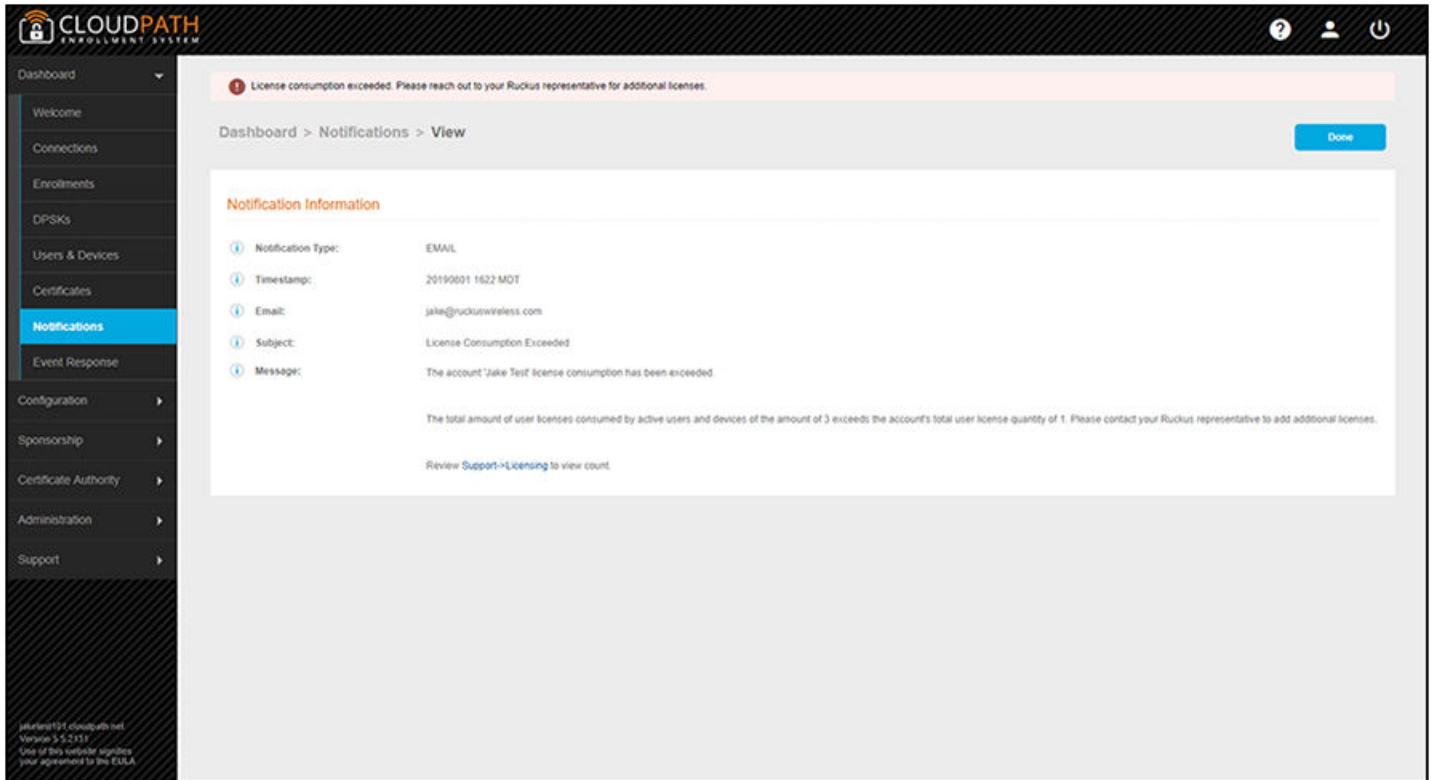
From the **Certificate Authority** tab, you can manually generate certificates, view certificate details, revoke certificates, manage the characteristics of certificates to be issued, and manage certificate authorities (CAs).

The **Administration** tab allows you to manage administrator accounts, system services, diagnostics and logs, and system updates.

The **Support** tab provides access to the Quick Start Guide and several Setup Guides to help with common configurations along with licensing information.

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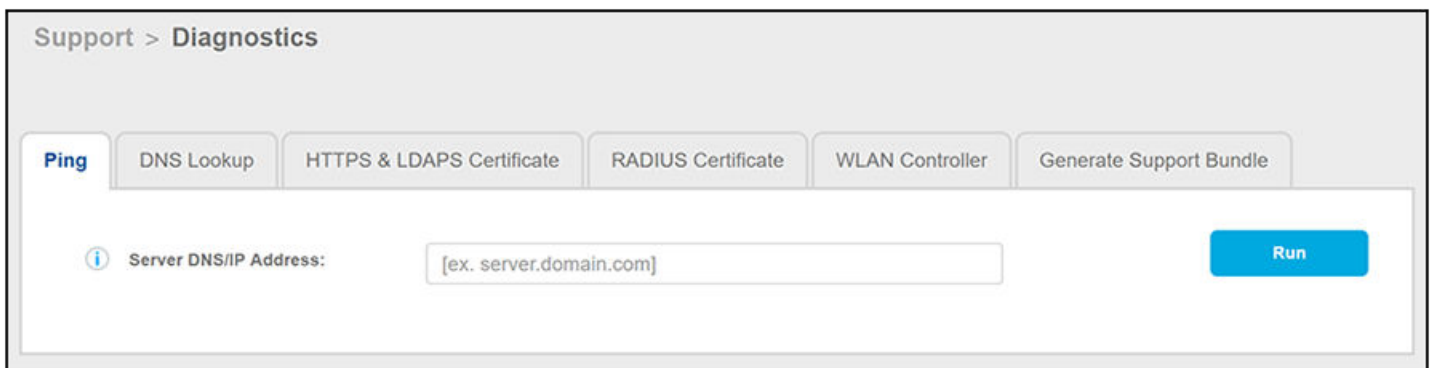
**FIGURE 75** License-Consumption Banner in Notifications When Consumption Exceeds Limit



## Diagnostics

The Diagnostics page provides useful tools for system troubleshooting connectivity issues and for verifying certificate information.

**FIGURE 76** Cloudpath Connectivity Diagnostics



The diagnostics include:

- Ping: Ping an IP address or hostname
- DNS Lookup: Provide server information and IP address for a given hostname.

- HTTPS & LDAPS Certificate: Query the server certificate used by a secured server (such as HTTPS or LDAPS) to verify the certificate currently in use by a server.
- RADIUS Certificate: Query the RADIUS server certificate and the chain presented by the RADIUS server. This is useful to verify the certificate currently in use by a RADIUS server. For this test to work, Cloudpath must be able to reach the IP and port, the shared secret must be correct, and Cloudpath must be an approved client for the RADIUS server.
- WLAN Controller: Query the WLAN controller to check if required ports are accessible.
- Generate Support Bundle: Click **Run** from this tab to generate a zip file that contains log files and metrics information to provide to your Ruckus support representative.

## Upload Support File

If Cloudpath support has provided a support file, you can upload it on this page. This will make changes to the system, so it is recommended that you first create a VMware snapshot.

### **NOTE**

Only use a support file with the assistance of the Cloudpath Support team.



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