CXE Collector Association

0.2.0

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1 Changelog

Version	Date	Author	Changes
0.1.0	2020-02-15	greherle	Initial Revision
0.2.0	2020-03-04	dstought	Updated association sequence diagram, added expiration sequence diagram

2 Chapter 1

2.1 Collector Association

To Associate a CX collector with the Portal in a secure way we adopt a mechanism often used to associate media players or smart TVs with a streaming media account. This process is well understood by modern users because they have used it in their personal life. It’s a proven secure means to associate a device with a backend account.

The Collector has three possible states: Raw, Connected, and Associated. When first booted it is in Raw state until it successfully connects to the Cisco Portal. Ideally the Collector will attempt to connect to a common DNS name that is associated with an anycast IP that will automatically associate with a portal in the closest AWS region.

The state diagram for these states is shown below:

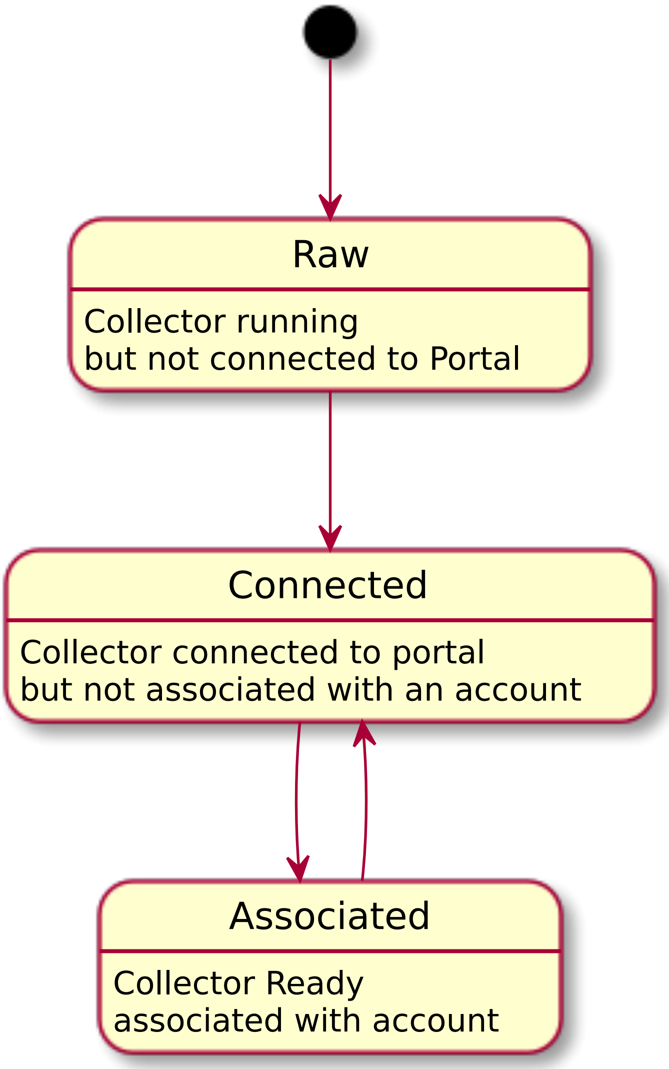

Raw
Collector running
but not connected to Portal
Connected
Collector connected to portal
but not associated with an account
Associated
Collector Ready
associated with account

Figure 1: Collector States

2.2 Human User Interactions

The human installing and configuring the collector will follow a well-known pattern used by companies to associated devices to accounts. As part of the installation process the collector will provide the user with an alphanumeric code which the user can use after authenticating to the Customer Portal to associate the collector to their customer account. The browser session is protected via HTTPS and the Cisco side will use a valid properly signed certificate. The user will also connect to the Collector over SSH. Ideally each Collector will have an SSH key generated for it prior to installation and the human user will be provided with the public key associated with that collector to ensure that only humans with that key can log on. Once associated keys can be rotated by the Portal in the background as needed. The human will issue simple commands to the Collector and get simple text replies and the SSH connection will be dropped automatically upon command completion. There is no need for a web browser connection and the associated signed certificate.

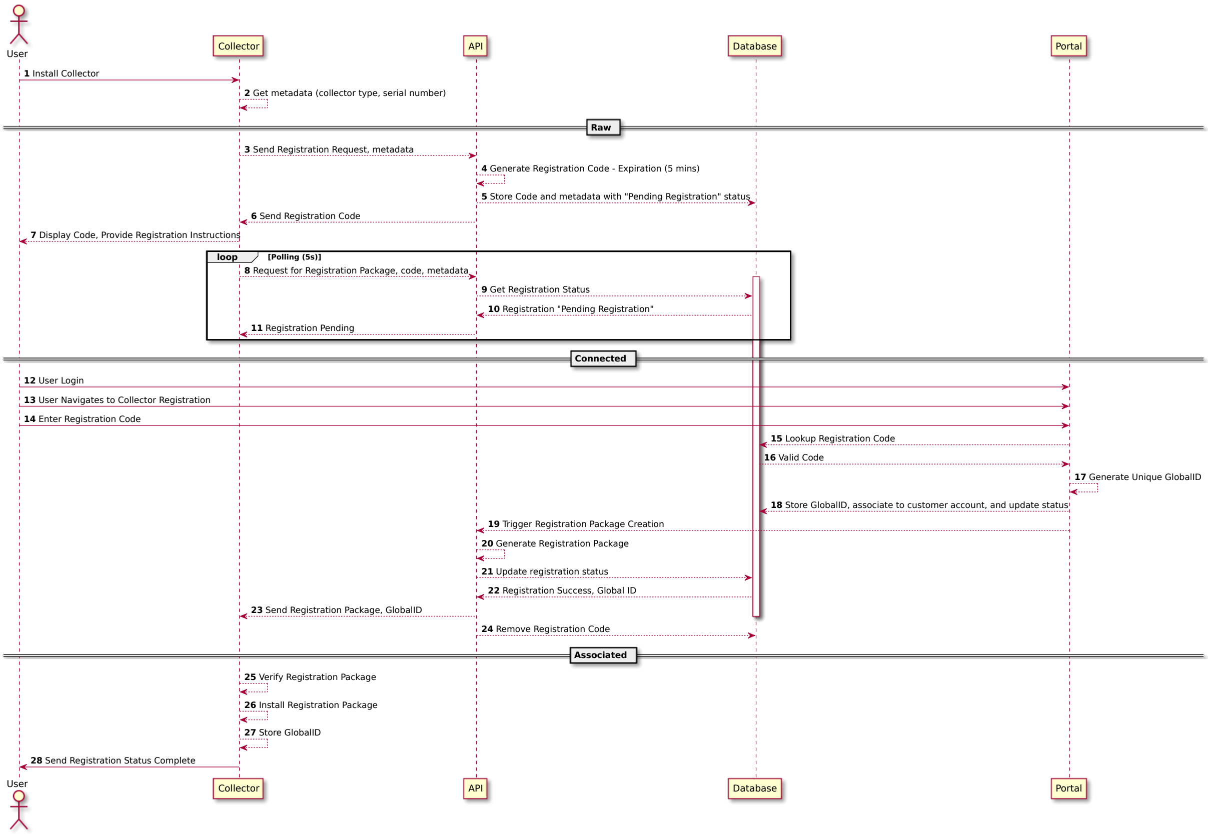

User
Collector
API
Database
Portal
1 Install Collector
2 Get metadata (collector type, serial number)
Raw
3 Send Registration Request, metadata
4 Generate Registration Code - Expiration (5 mins)
5 Store Code and metadata with "Pending Registration" status
6 Send Registration Code
7 Display Code, Provide Registration Instructions
loop [Polling (5s)]
8 Request for Registration Package, code, metadata
9 Get Registration Status
10 Registration "Pending Registration"
11 Registration Pending
Connected
12 User Login
13 User Navigates to Collector Registration
14 Enter Registration Code
15 Lookup Registration Code
16 Valid Code
17 Generate Unique GlobalID
18 Store GlobalID, associate to customer account, and update status
19 Trigger Registration Package Creation
20 Generate Registration Package
21 Update registration status
22 Registration Success, Global ID
23 Send Registration Package, GlobalID
24 Remove Registration Code
Associated
25 Verify Registration Package
26 Install Registration Package
27 Store GlobalID
28 Send Registration Status Complete
User
Collector
API
Database
Portal

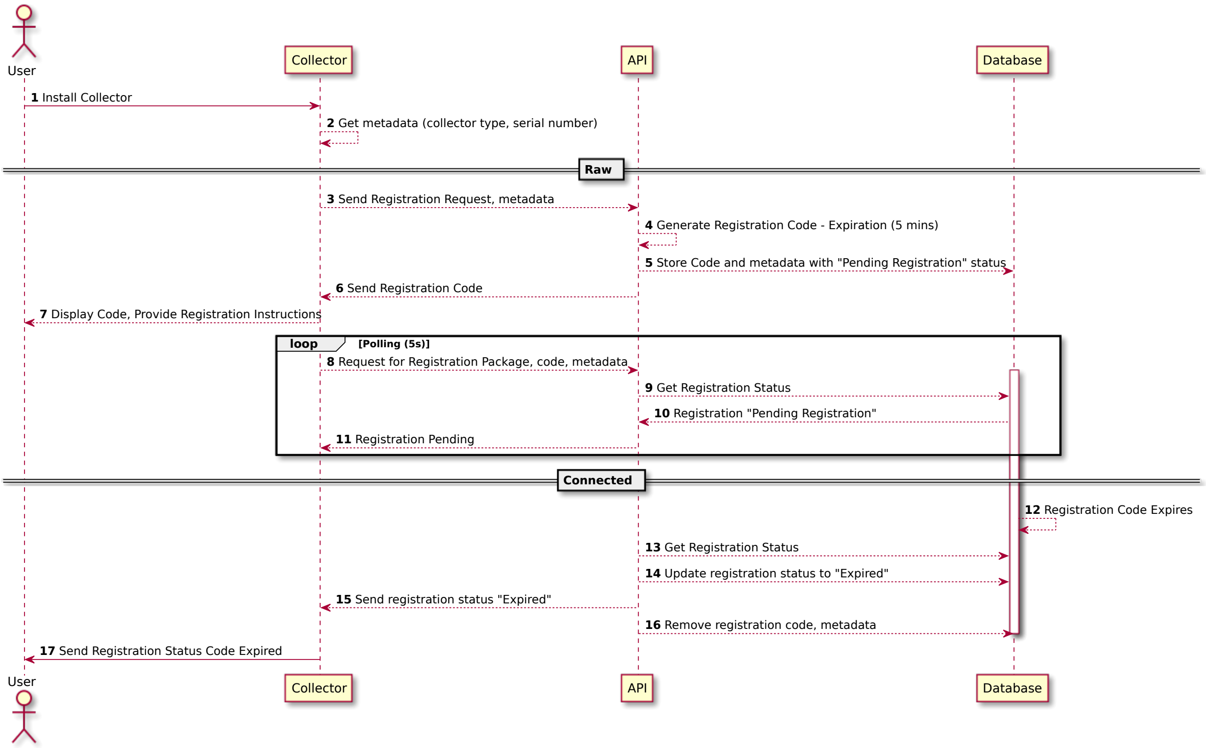
Figure 2: Collector Association Sequence

1-2. Upon completion of the collector installation process the collector gets its type, serial number, and other metadata.
3. The collector send the metadata along with a registration request to the registration API.
4. The registration API generates a small alphanumeric string as the registration code with an expiration timestamp. The registration API must be the entity to generate the registration code rather than the collector to avoid code collision with other collectors.
5. The registration API stores the metadata, registration code, and status (“Pending Registration”) in the database.
6. The registration code is sent back to the collector.
7. The collector displays the registration code to the user with instructions on how to access the registration page within Customer Portal.

8-11. The collector starts polling the registration API sending its metadata and registration code requesting the registration file. The registration API will return a status of pending until the registration expires or the user successfully submits the registration code in the Customer Portal.
12-14. While the collector is polling the API the user logs into the Portal, navigates to the registration page and enters their registration code.
15-16. The portal lookups the code in the database and validates the code.
17-18. Upon a successful validation the portal will generate a unique global ID, associate it to the user's customer account in the database, and update the registration status to "Authorized".
19. The portal calls the API to trigger the registration package generation process.
20-21. The API generates the registration package and updates the registration status to "Complete".
22. The API responds to the polling collector with the registration package and global Id.
23. The API updates the database to remove the registration code so it can be used in the future.
24-26. The Collector verifies and installs the registration package and stores the global Id.
27. The collecor responds to the user the completion of the registration process.

2.3 Expired Registration Code

In the event the user does not enter the Customer Portal registration code prior to the code expiration, the collector cannot be successfully registered. The user would need to interact with the collector to start the registration process again and obtain a new registration code.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3 Send Registration Request, metadata
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5 Store Code and metadata with "Pending Registration" status
6 Send Registration Code
7 Display Code, Provide Registration Instructions
loop
[Polling (5s)]
8 Request for Registration Package, code, metadata
9 Get Registration Status
10 Registration "Pending Registration"
11 Registration Pending
Connected
12 Registration Code Expires
13 Get Registration Status
14 Update registration status to "Expired"
15 Send registration status "Expired"
16 Remove registration code, metadata
17 Send Registration Status Code Expired
User
Collector
API
Database

Figure 3: Collector Expiration Sequence

1-11. These steps remain the same as described above.
12. The user does not enter the registration code in the portal prior to the registration code expiration timestamp.
13-14. The API checks the status of the registration code, notices the code has expired, and updates the database registration status to “Expired”.
15. The API responds to the collector’s polling request with the updated registration status.
16. The API removes the registration code and metadata associated to the code from the database.
17. The collector exits polling and displays the registration status to the user.

2.4 Collector Reset

In the event that a Collector is to be retired, moved or reset, the following similar sequence is defined to disconnect a Collector from the Portal and completely reset it:

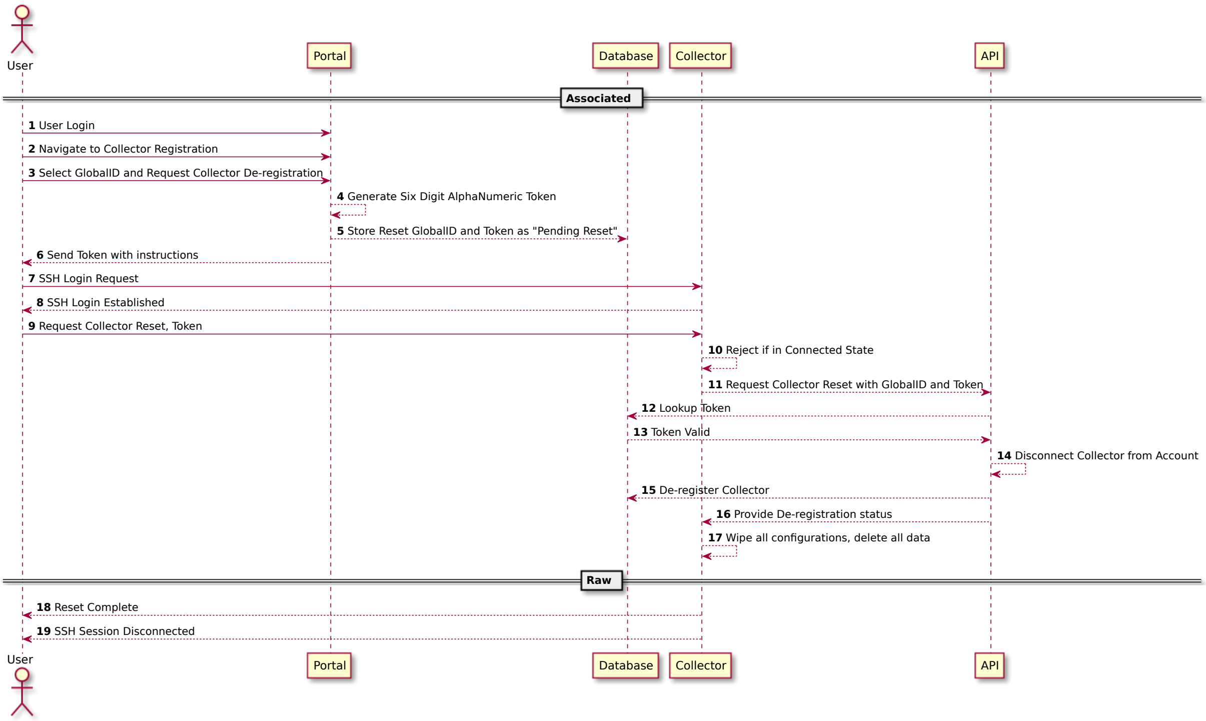
User
Portal
Database
Collector
API
Associated
1 User Login
2 Navigate to Collector Registration
3 Select GlobalID and Request Collector De-registration
4 Generate Six Digit AlphaNumeric Token
5 Store Reset GlobalID and Token as "Pending Reset"
6 Send Token with instructions
7 SSH Login Request
8 SSH Login Established
9 Request Collector Reset, Token
10 Reject if in Connected State
11 Request Collector Reset with GlobalID and Token
12 Lookup Token
13 Token Valid
14 Disconnect Collector from Account
15 De-register Collector
16 Provide De-registration status
17 Wipe all configurations, delete all data
Raw
18 Reset Complete
19 SSH Session Disconnected
User
Portal
Database
Collector
API

Figure 4: Collector Reset Sequence