



CONNECTING
THE WORLD

Niagara Data Service API

Niagara Cloud Suite API

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Tridium

Today's Topics

Niagara Cloud Suite (NCS)

Niagara Data Service (NDS)

API Usage

Questions



niagara cloud SUITE™

Niagara Cloud is a scalable cloud-based solution that provides secure, remote building management services in accordance with Tridium's model of open and extensible integration with devices, services, and applications.

PREREQUISITES:

- Niagara Framework® ~ Supported Versions
- Active Software Maintenance Agreement

Niagara Cloud Suite

NDS
Histories

NDS
Alarms

NDS
Schedules

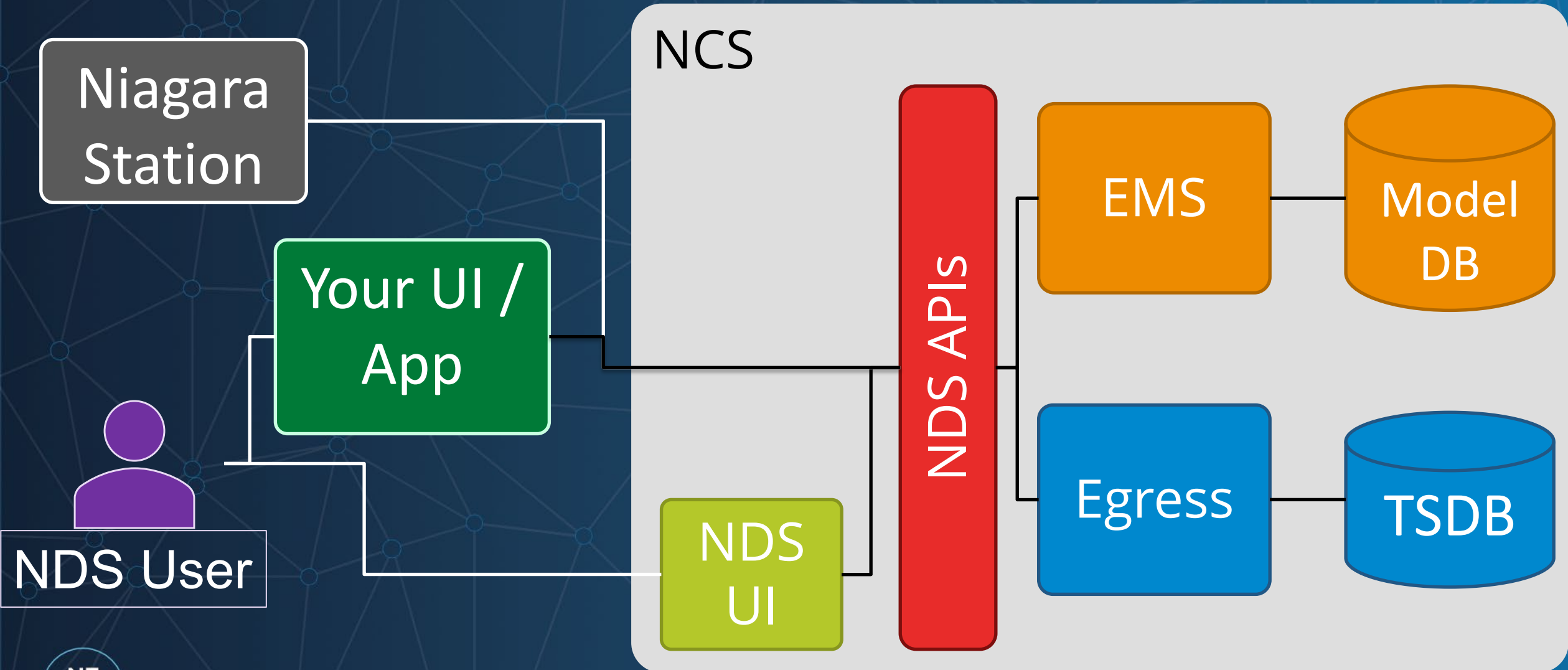
Niagara
Recover

Niagara
Remote

Niagara Data Service

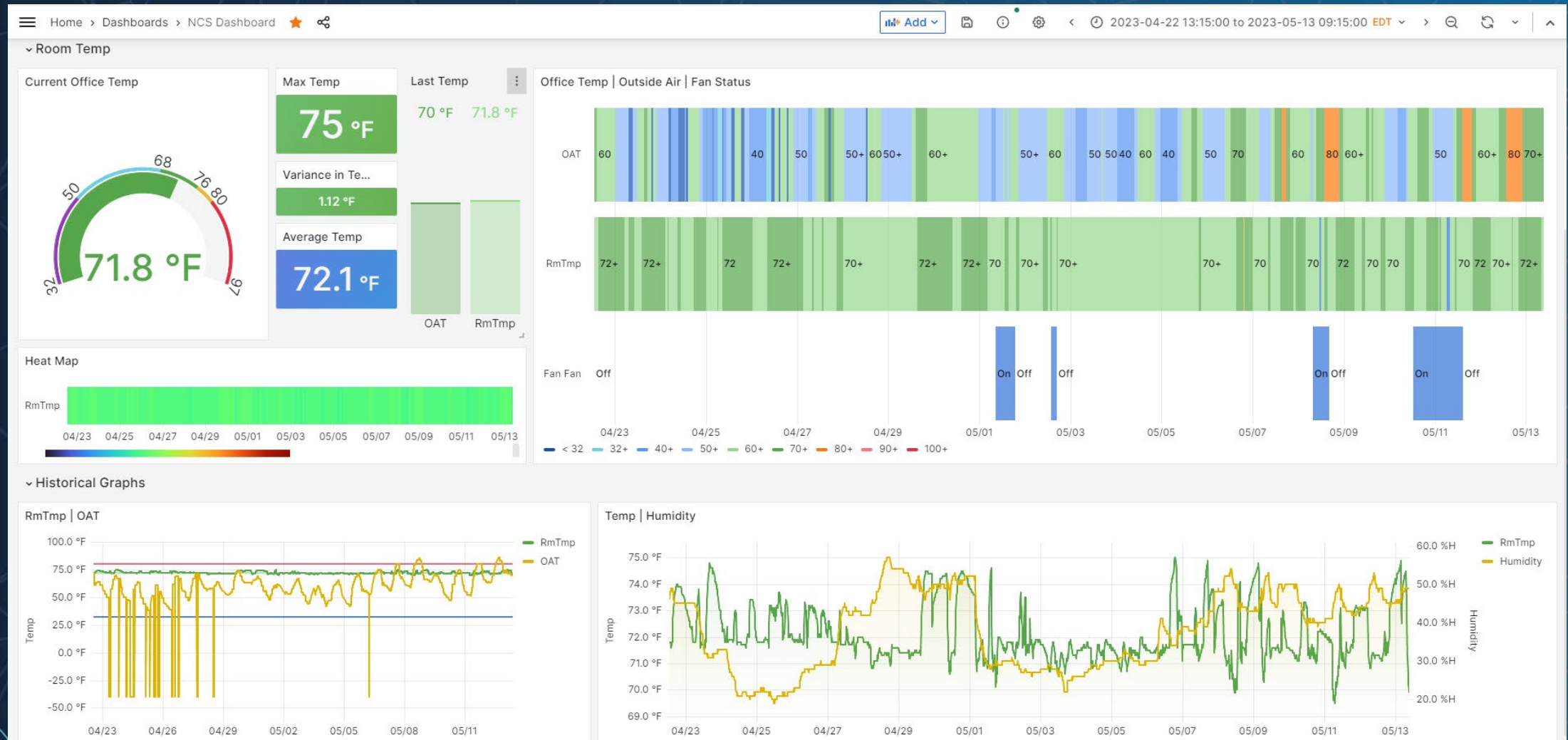
NCS Management Portal

Niagara Data Service



That's fine, but...
How do I use it?

NCS Demo Dashboard



Using NDS APIs

1. Create a Service Account
2. Obtain an access token
3. Use EMS API to find points
4. Use Egress API to get history data

Using NDS APIs

Spring Boot App
Uses HttpClient
Demonstrates

- Get access token
- Query EMS API
- Query Egress API

```
@SpringBootApplication
@Slf4j
public class NdsApiDemoApplication {
    * Craig Gemmill *
    @Bean
    public CommandLineRunner run(RestTemplate restTemplate) throws Exception {
        return args -> {
            // Get an access token
            NdsApiTokenHolder holder = getAccessToken();

            // Query EMS for points
            List<Point> points = modelQuery(holder.getAccessToken());

            // Query Data Egress service for telemetry data
            for (Point point : points) {
                TsdbQueryResponse telemData = readTelemetryData(
                    holder.getAccessToken(), queryConfig.getSystemGuid(), point.getCloudId());
            }
        };
    }
}
```

Using NDS APIs

1. Create a Service Account

Create a Service Account

The screenshot shows the 'niagara cloud' interface for 'Craigs Controls'. It displays a grid of customer cards under the heading 'ALL CUSTOMERS'. A search bar and a '+ Create New Customer' button are at the top right. The 'CGEMS' card is highlighted with a red border.

ALL CUSTOMERS	
TEST CUSTOMER KREATY21 10 Projects 222 Devices	FRANCESCA'S 1 Projects 24 Devices
CGEMS 1 Projects 21 Devices	123 0 Projects 0 Devices
TEST 12 1 Projects 0 Devices	MARCH2 0 Projects 0 Devices
	KREATYV 4 Projects 10 Devices
	JEST TEST 0 Projects 0 Devices

Create a Service Account



[← Back](#)
CUSTOMER
cgems

[Service Accounts](#)

PROJECTS (1)

cgproj

[+ Create New Project](#)

CGPROJ
 Sort by 
1-15 of 21

DEVICE/HOST ID	PROJECT/LOCATION	SUBSCRIBED SERVICES	
cg413ndsqaems1 Tst-46E5-5AA2-91D5-C863	cgproj Montpelier	 	
cg4105qands1 Tst-9771-46B4-7AFE-90DE	cgproj asdf	 	
WinSuper4130104b-cg Tst-1D68-E508-69D1-6A40	cgproj Montpelier	 	
cgndsqaems Tst-E8DE-9C2D-80A4-4FAB	cgproj Montpelier	 	
cg4105qanr Tst-84C8-953F-8D04-14A7	cgproj rva	 	

 **1** **2** 


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Create a Service Account



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SERVICE ACCOUNTS

MY SERVICE ACCOUNTS

Create New Account

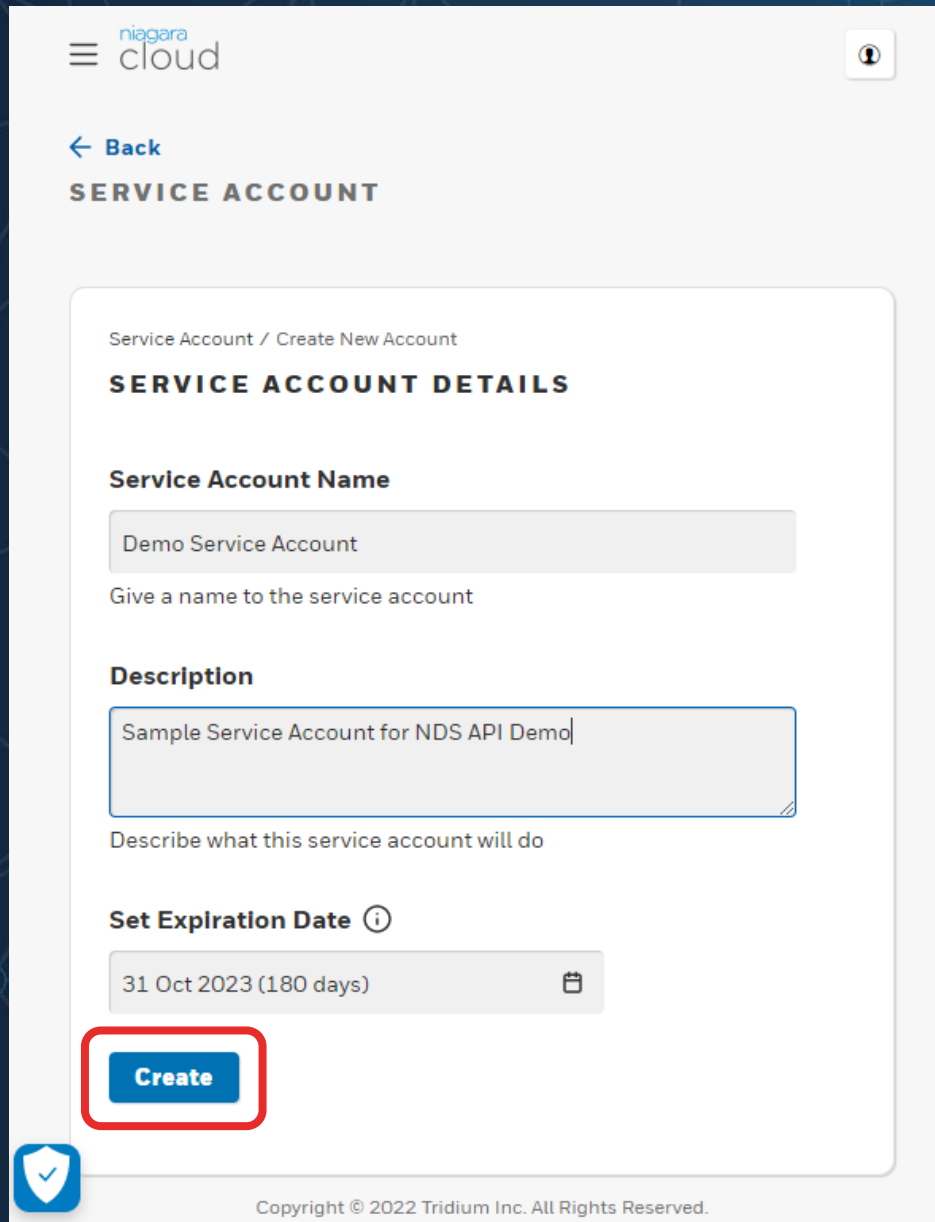
1 Result

SERVICE ACCOUNT NAME	EXPIRATION DATE	ACTION
Craig SI Admin Client Id: e53bc1c0-a00f-4f4f-bb6d-d68f82c58415	10 Oct, 2023	Details 



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Create a Service Account



niagara cloud

← Back

SERVICE ACCOUNT

Service Account / Create New Account

SERVICE ACCOUNT DETAILS

Service Account Name

Demo Service Account

Give a name to the service account

Description

Sample Service Account for NDS API Demo

Describe what this service account will do

Set Expiration Date ⓘ

31 Oct 2023 (180 days)

Create

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Service Account Name

Description

Expiration Date



Service Account Created

Client ID

Like a username

Client Secret

Like a password

Store this **SECURELY!**

SERVICE ACCOUNT CREATED

The Client ID can always be accessed from the service account page.

Your Client ID ⓘ

2210ea92-7efb-4557-8501-60a18ffe5f8e



Your Client Secret ⓘ

Nly8jkoQH0~fDjp2vtXlz7z_Bz9y07l-nEPxcxC89esP8~thJ62KgyQp...



The Client Secret is not being saved; please copy and paste it somewhere safe for future reference.

Close

Using NDS APIs

1. Create a Service Account
2. Obtain an access token

Get an Access Token

OAuth request data

- grant_type: client_credentials
- scope: ncp:read

```
private NdsApiTokenHolder getAccessToken() throws Exception {  
    // Use form data for authentication type and scope  
    Map<Object, Object> requestData = new HashMap<>();  
    requestData.put("grant_type", "client_credentials");  
    requestData.put("scope", "ncp:read");  
}
```

Get an Access Token

Build HTTP Request

- Token endpoint URI is documented
- **client_id**: from Service Account
- **client_secret**: from Service Account

```
// Build the HTTP Request
HttpRequest tokenRequest = HttpRequest.newBuilder()
    // Use NCS authentication endpoint from configuration file
    .uri(URI.create(authConfig.getTokenUri()))

    // Serialize request data into JSON string
    .POST(toFormData(requestData))

    // Include content type for the form data
    .header(name: "Content-Type", value: "application/x-www-form-urlencoded")

    // Include the authorization header
    .header(name: "Authorization", getAuthHeader(authConfig.getClientId(), authConfig.getClientSecret()))
    .build();
```

Get an Access Token

Send request

Deserialize return value

Store access token

```
... // Send HTTP request and handle response
... HttpResponse<String> response = httpClient.send(tokenRequest, HttpResponse.BodyHandlers.ofString());
... NdsApiTokenHolder tokenHolder = mapper.readValue(response.body(), NdsApiTokenHolder.class);
... return tokenHolder;
... }
```

Using NDS APIs

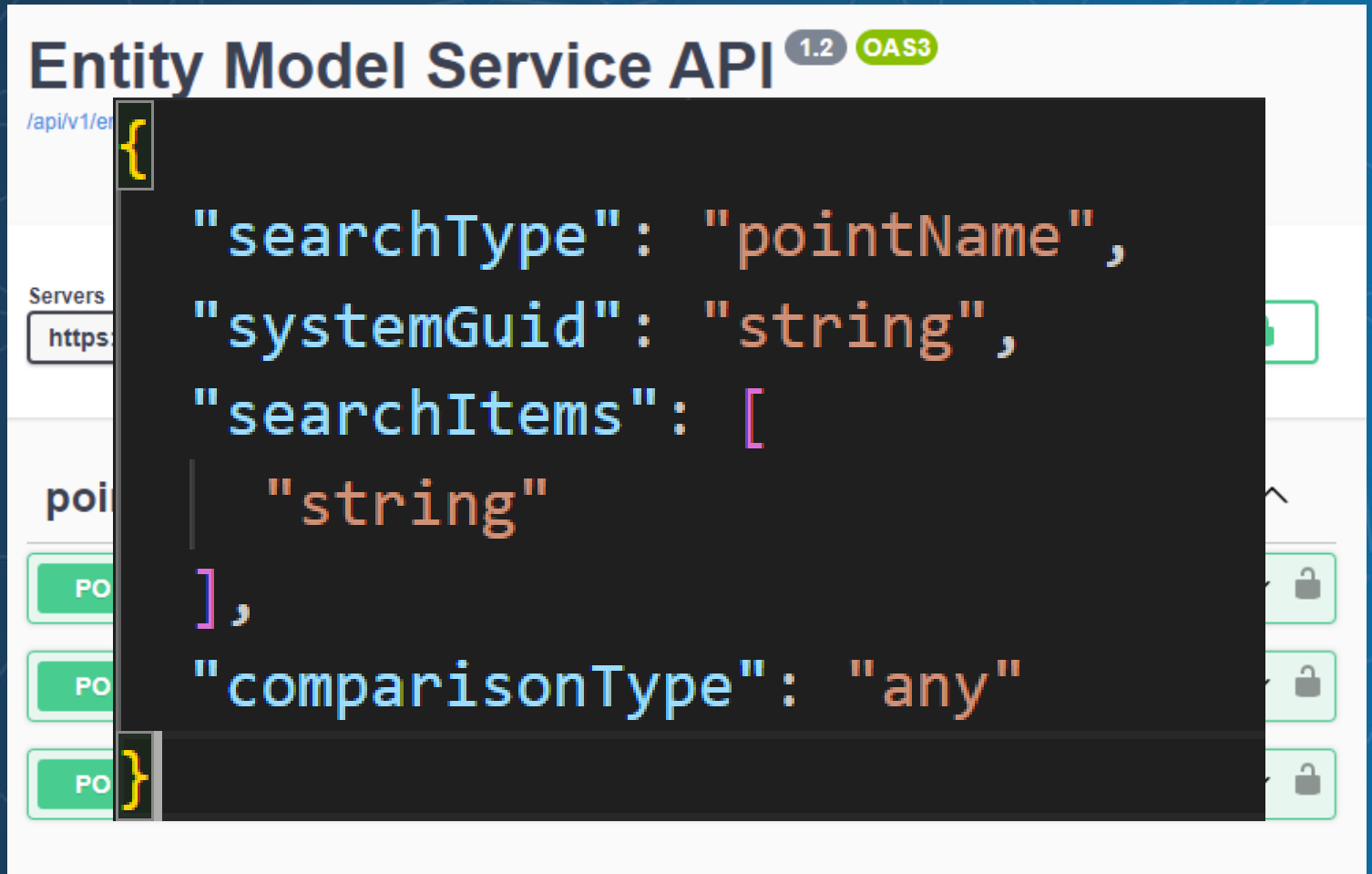
1. Create a Service Account
2. Obtain an access token
3. Use EMS API to find points

Entity Model Service API

Search by

- Point Name
- Tag Name
- Tag Value

Specified in
Search Criteria



Query EMS

Search Type defines by point, tag, or value

Comparison Type defines match criteria for items

- any, exact, startsWith, endsWith, contains, equals

```
private List<Point> modelQuery(String accessToken) throws Exception {  
    // Build EMS search query  
    SearchCriteria searchQuery = new SearchCriteria(  
        queryConfig.getSearchType(),  
        queryConfig.getSystemGuid(),  
        queryConfig.getSearchItems(),  
        queryConfig.getComparisonType());  
    String queryBody = mapper.writeValueAsString(  
        searchQuery  
    );  
}
```

Query EMS

URI uses Customer ID

Include access token in Authorization header

```
// Build EMS query request
String route = String.format(emsRoute, queryConfig.getCustomerId());
HttpRequest modelQuery = HttpRequest.newBuilder()
    .uri(URI.create(ndsApiHost + route))
    .POST(HttpRequest.BodyPublishers.ofString(queryBody))
    .header(name: "Content-Type", value: "application/json")
    .header(name: "Authorization", value: "Bearer " + accessToken)
    .build();
```

Query EMS

Send request

Deserialize return value

Return list of matching points

```
// Send HTTP request to EMS and handle response  
HttpResponse<String> response = httpClient.send(modelQuery, HttpResponse.BodyHandlers.ofString());  
EmsQueryResponse body = mapper.readValue(response.body(), EmsQueryResponse.class);  
List<Point> points = Optional.ofNullable(body.getContent()).orElse(new EmsQueryResults()).getPoints();  
return points;
```

Using NDS APIs

1. Create a Service Account
2. Obtain an access token
3. Use EMS API to find points
4. Use Egress API to get history data

Data Egress API

Query Parameters

- System GUID
- Cloud Id (list)
- Start Time
- End Time
- Record Limit

Egress API ^{2.0} ^{OAS3}

/api/v1/egress/openapi.json

Authorize



egress-controller

POST /api/v1/egress/telemetry Fetch device history

Parameters

Try it out

No parameters

Request body ^{required}

application/json

Example Value | Schema

```
{
  "systemGuid": "a1b45678-0235-184b-9b45-1e671a7dfay",
  "cloudId": [
    "ab1c1234-6e89-44do-7ccf-68dbe693a9hew",
    "e5babdey32-4232-4867-9a94-770cd8a1234"
  ],
  "startTime": "2022-01-03T06:28:14.353Z",
  "endTime": "2022-03-23T08:59:49.427Z",
  "recordLimit": "500",
  "includePreRecord": true,
  "includePostRecord": true,
  "sortAscending": false
}
```

Query TS DB via Egress API

```
private TsdbQueryResponse readTelemetryData(String accessToken, String systemGuid, String cloudId)
    throws Exception { You, 15 minutes ago • Uncommitted changes

    // Build telemetry query
    TsdbQuery query = TsdbQuery.builder()
        .systemGuid(systemGuid)
        .startTimeStr(queryConfig.getStartTimeStr())
        .endTimeStr(queryConfig.getEndTimeStr())
        .recordLimitStr("5")
        .cloudId(List.of(cloudId))
        .build();
    String queryBody = mapper.writeValueAsString(query);
```

Query TS DB via Egress API

URI is not customer specific

Include access token in Authorization header

```
// Build request for Egress Service  
HttpRequest telemRequest = HttpRequest.newBuilder()  
    .uri(URI.create(ndsApiHost + dataEgressRoute))  
    .POST(HttpRequest.BodyPublishers.ofString(queryBody))  
    .header(name: "Content-Type", value: "application/json")  
    .header(name: "Authorization", value: "Bearer " + accessToken)  
    .build();
```

Query TS DB via Egress API

Send request

Deserialize return value

Return list of history records

```
// Send HTTP request to Egress Service and handle response
HttpResponse<String> response = httpClient.send(
    telemRequest, HttpResponse.BodyHandlers.ofString());
TsdbQueryResponse telemData = mapper.readValue(
    response.body(), TsdbQueryResponse.class);
return telemData;
```

Let's see this in action...

NDS API Usage Demo

```
E333935@VA51LTB7SP5J3 C:\Tridium\NF2023\DevDay\Cloud\ndsapidemo
# java -jar target\nds-api-demo-0.0.1-SNAPSHOT.jar
```

```

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  \V/   _ ) | _ ) | | | | | | | | ( | ) ) )
      |  _ | . _ | | | | | | | | \ , | / / / /
=====|_|=====|_|/=/ / / / /
:: Spring Boot ::                (v3.0.0)

```

```
2023-05-09T10:28:12.231-04:00 INFO 25260 --- [main] c.t.ndsApiDe
ith PID 25260 (C:\Tridium\NF2023\DevDay\Cloud\ndsapidemo\target\nds-api-demo
2023-05-09T10:28:12.233-04:00 INFO 25260 --- [main] c.t.ndsApiDe
2023-05-09T10:28:12.987-04:00 INFO 25260 --- [main] o.s.b.w.embe
2023-05-09T10:28:12.994-04:00 INFO 25260 --- [main] o.apache.ca
2023-05-09T10:28:12.994-04:00 INFO 25260 --- [main] o.apache.ca
2023-05-09T10:28:13.062-04:00 INFO 25260 --- [main] o.a.c.c.C.[T
2023-05-09T10:28:13.063-04:00 INFO 25260 --- [main] w.s.c.Sonyl
```

Documentation and Code

- NCS Documentation Home
 - <https://docs.niagara-community.com/category/NCS>
- NDS API Guide
 - <https://docs.niagara-community.com/bundle/NdsApi/page/index.html>
- NCS Partner Guide
 - <https://docs.niagara-community.com/bundle/NcsPartner/page/index.html>
- Example Reference code will be posted to Tridium GitHub Repository at <https://github.com/tridium>

Questions

Thank You!



CONNECTING
THE WORLD

END OF PRESENTATION