Week 3: Add Enterprise Qualities

Unit 5: Authorization and Authentication

Overview

Intro: Security and SAP Cloud Application Programming Model

- Authentication, identification, and authorization
- Integration in SAP Cloud Application Programming Model

Part 1: Add security to existing project

- Add annotations

Part 2: Custom code

- Add custom code

Part 3: SAP Cloud Platform

- Configuration in the cockpit

Authorization & Trust Management

Intro: Security and SAP Cloud Application Programming Model

Business services in the public cloud need special protection

Authentication vs authorization

- Authentication and identification:
  - → "Who am I?"
  - → Integration in standard technologies and centralized services
- Authorizations:
  - → "What am I allowed to do?"
  - → Ensure compliance and auditability

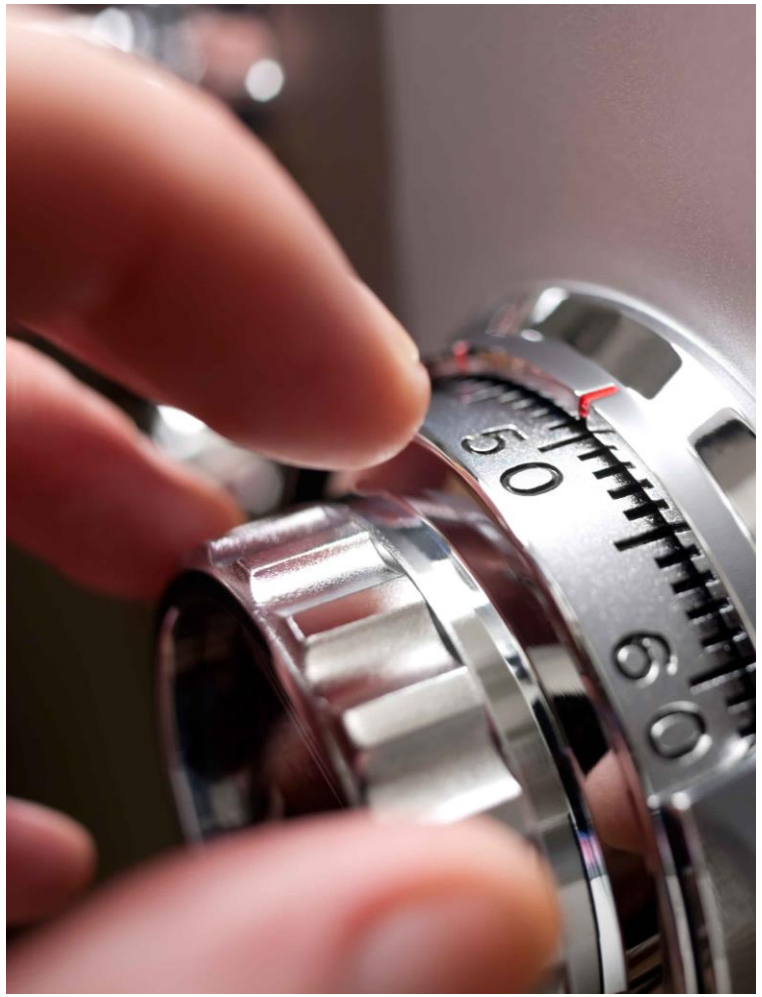
Support by SAP Cloud Application Programming Model

- Provides annotations to easily define the security settings in the CDS model
- Provides standard roles
- Provides APIs to enable authorization checks also in custom code
- Generates the authorization information for the `xs-security.json`

Intro: Security model

Basic ideas and principles

- Close integration between data/service model and authorization model
- Separation of concerns is possible
- Usage of the service-based modeling approach also for modeling the authorizations (use data-centric authorizations only where it makes sense)



Intro: Annotations in CDS model

`@restrict`

- allows fine-grained control through an array of privileges given as grant statements in the form `{grant:<operation>, to:<roles>, ...}.`
-
```
entity Orders @restrict: [{
grant: 'READ', to: 'authenticated-user',
               where: 'createdBy = $user'
```

`@requires`

- allows specifying one or more user roles (as a single string or an array of strings) that must be assigned to the current user (combined with OR)
- is just a convenience shortcut of `@restrict`
- `service CustomerService @(requires:'authenticated-user')`

Predefined roles

- `authenticated-user, identified-user, system-user, any`

Intro: Example with annotations on entity and service level

`@requires` on service level

service.cds

```
service CustomerService @(requires:'authenticated-user')

service OwnerService @(requires:'owner_role')
```

`@restrict` on entity level

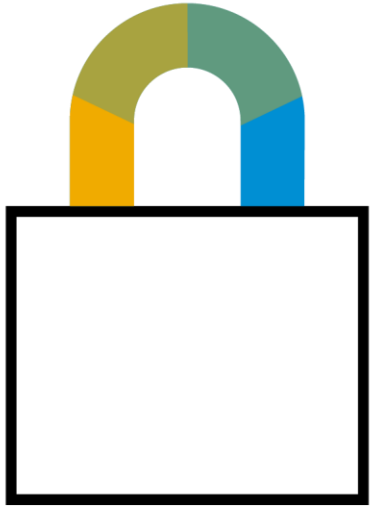
service.cds

```
entity Orders @restrict: [{
grant: 'READ', to: 'authenticated-user',
               where: 'createdBy = $user'
}
```

Part 1: Add security to existing project

Goal:

- Use existing “bookshop” project and add security
  - Define `CustomerService` → can be invoked by all users who are authenticated
  - Define `OwnerService` → can only be invoked by users with role “`owner_role`”
- Privileges:
  - User with role “owner_role” can do everything
  - Authenticated user has the following permissions:
    - Can view all books and authors, but not create
    - Can create orders, but view only those orders which were created by her/him



Part 1: Add security to existing project

Implementation:

- No code required
- Add annotations to declare which roles are required

service.cds

```
service OwnerService @(requires:'owner_role'){
   entity Books as projection on my.Books;
   . . .
}

service CustomerService @(requires:'authenticated-user') {
   . . .
   entity Orders as projection on my.Orders;
}

annotate CustomerService.Orders with
   @restrict: [
      { grant: 'READ', to: 'authenticated-user', where: 'createdBy = $user' },
      { grant: 'UPDATE', to: 'authenticated-user', where: 'createdBy = $user' }
      ] ;
```

Part 1: Add security to existing project

Configuration for local execution:

- `package.json`
  - add and install dependency
    `"passport": "*"`
- `.cdsrc.json`
  - configure mock users

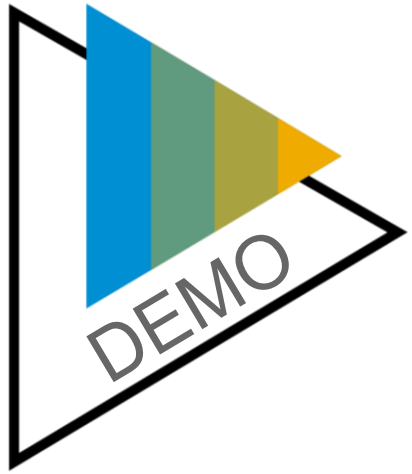
.cdsrc.json

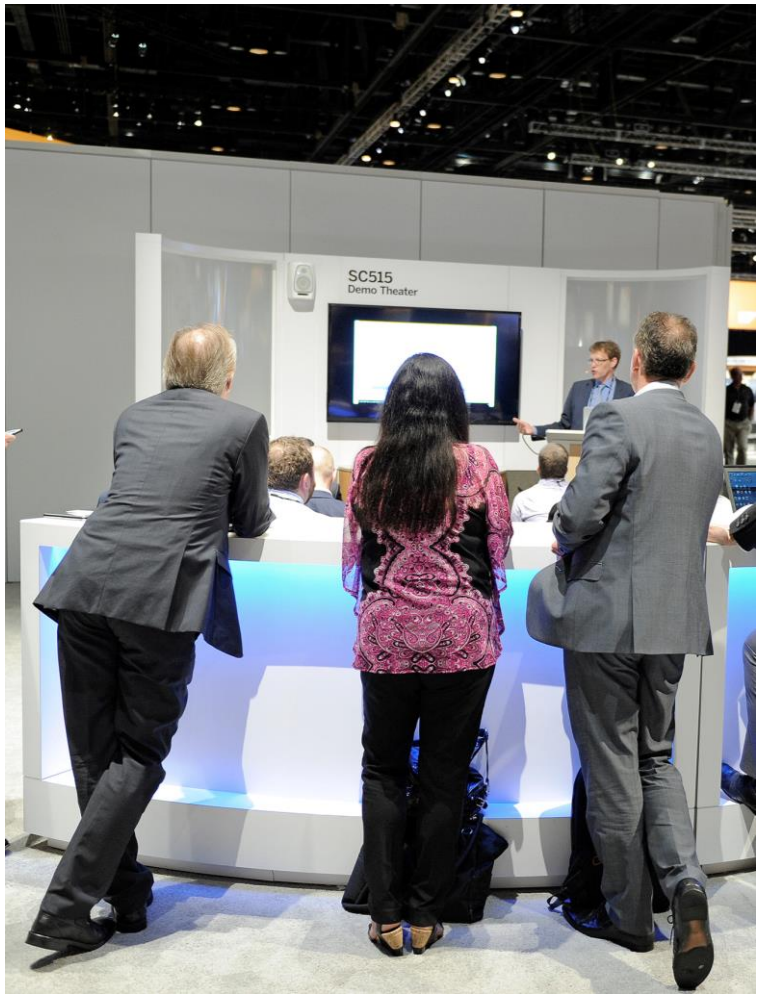
```
"cds": {
   "auth": {
     "passport": {
       "strategy": "mock",
       "users": {
         "ottoowner": {
           "ID": "ottoowner@mail.com",
           "password": "123",
           "roles": [
             "owner_role"
           ]
         },
         "uteuser": {
           "ID": "uteuser@mail.com",
           "password": "123"
         }
```

Demo 1: Add security to existing project

Demo:

- Add configuration – no code
- Test locally with mock users





Part 2: Writing custom code

API for accessing info of JWT token

- “Enforcement API”
- Used in handler implementation
- Manual check of required role
- Get info about the logged-in user

Examples

- Checking role:

service.js

```
srv.before (['READ', 'CREATE'], 'Orders', req =>

    req.user.is('admin') || req.reject(403)
```

- Checking user attribute:

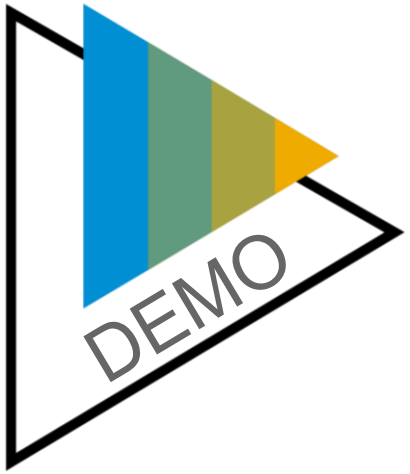
service.js

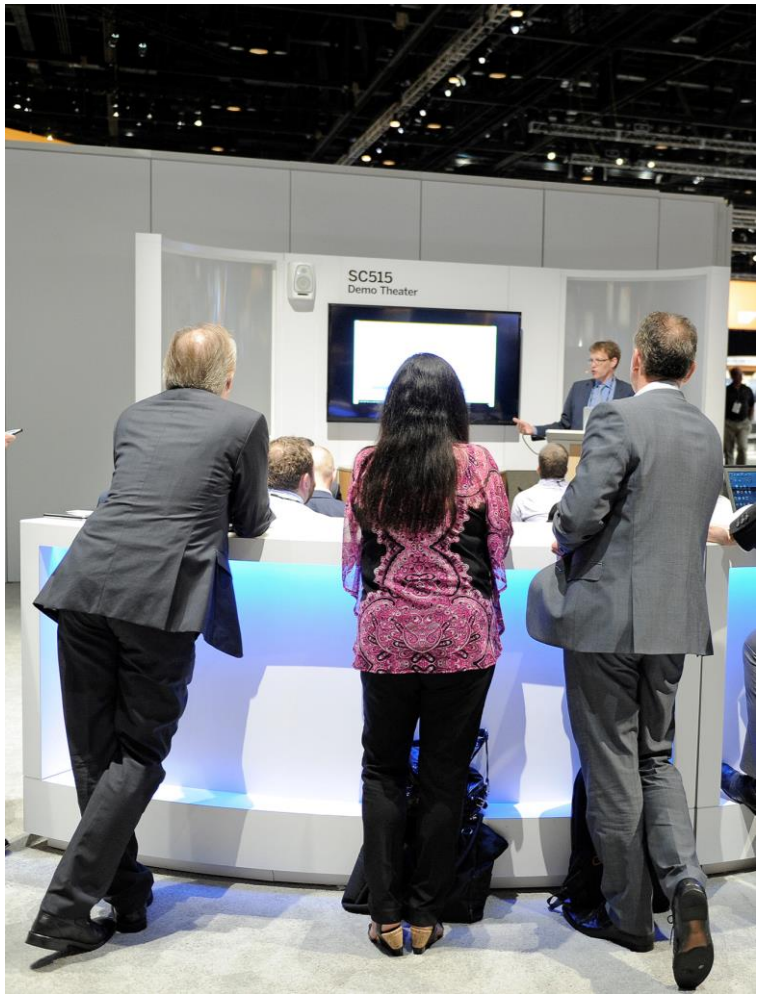
```
srv.before ('*', 'Approval', req =>

   Req.user.approverLevel > 1 || req.reject(403)
```

Demo 2: Custom code

Demo:

- Goal:
  Before order creation, the code in the custom handler should do a specific check that cannot be done by the framework, for example, whether the user is allowed to create this specific order.





Part 3: SAP Cloud Platform

In SAP Cloud Platform, XSUAA is used for

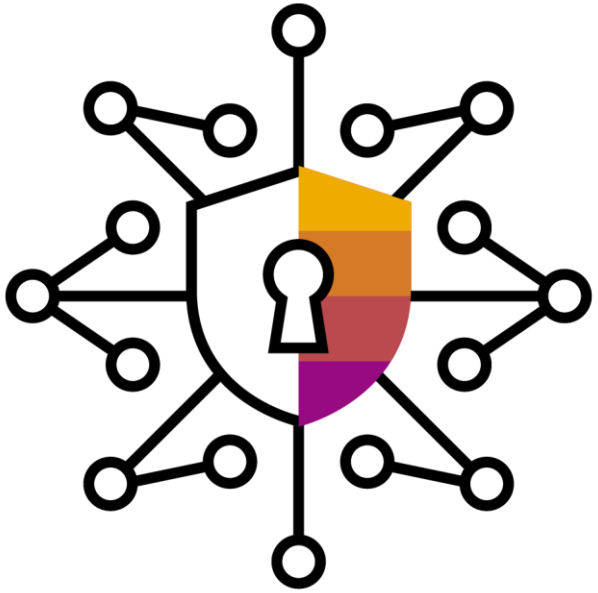
- OAuth2 security flow
- managing scopes/roles,
- validating users against identity provider, etc.

SAP Cloud Application Programming Model supports:

- generation of security artifacts out of CDS model

```
cds compile srv/ --to xsuaa > xs-security.json
```

- Node.js runtime uses `@sap/xssec` to communicate with XSUAA
- Runtime parses JWT token and provides “Enforcement API”



Part 3: SAP Cloud Platform

Implementation

- No code changes

Configuration

- `package.json`:
  install required dependencies security configuration: `xsuaa`
- `manifest.yml`:
  add reference to the instance of *xsuaa* service
- `mta.yaml` (for bigger projects , same syntax))

package.json

```
"dependencies": {
  "passport": "latest",
  "@sap/xssec": "^2.2.3",
  "@sap/audit-logging": "^3.0.2„
...
"cds": {
  "requires": {
    "uaa": {
        "kind": "xsuaa"
```

manifest.yml

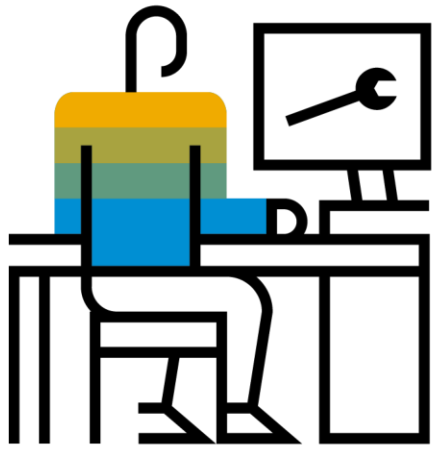
```
- name: myAppName
  ...
  services:
    - xsuaaBookshop
```

Part 3: SAP Cloud Platform

SAP Cloud Platform: security configuration

- Create XSUAA service instance with MTA
  - Add path to generated `xs-security.json` in `mta.yaml`:

```
- name: capire-bookshop-uaa
  type: org.cloudfoundry.managed-service
  parameters:
    path: ./xs-security.json
```



- Create role and role collection
  - Role is available according to CDS
  - Create role collection with name of choice
- Adapt trust configuration
  - Assign role collection to demo user
  - Add a second user without role assignment

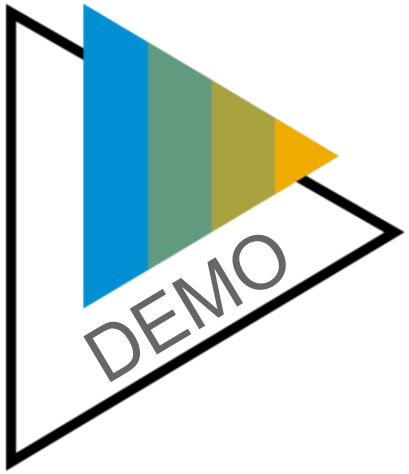
Test

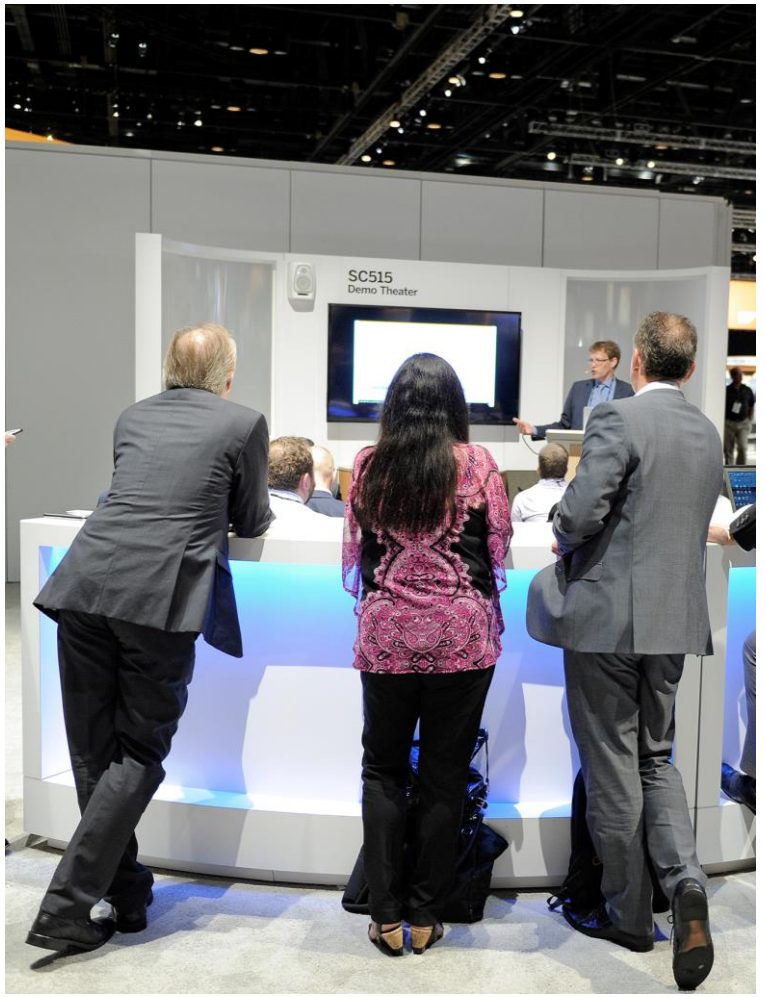
- Use REST client
  - to fetch token, then call service

Demo 3: SAP Cloud Platform

Demo:

- Goal:
  - Test the CAP app in productive environment
  - Test the security handling with real users

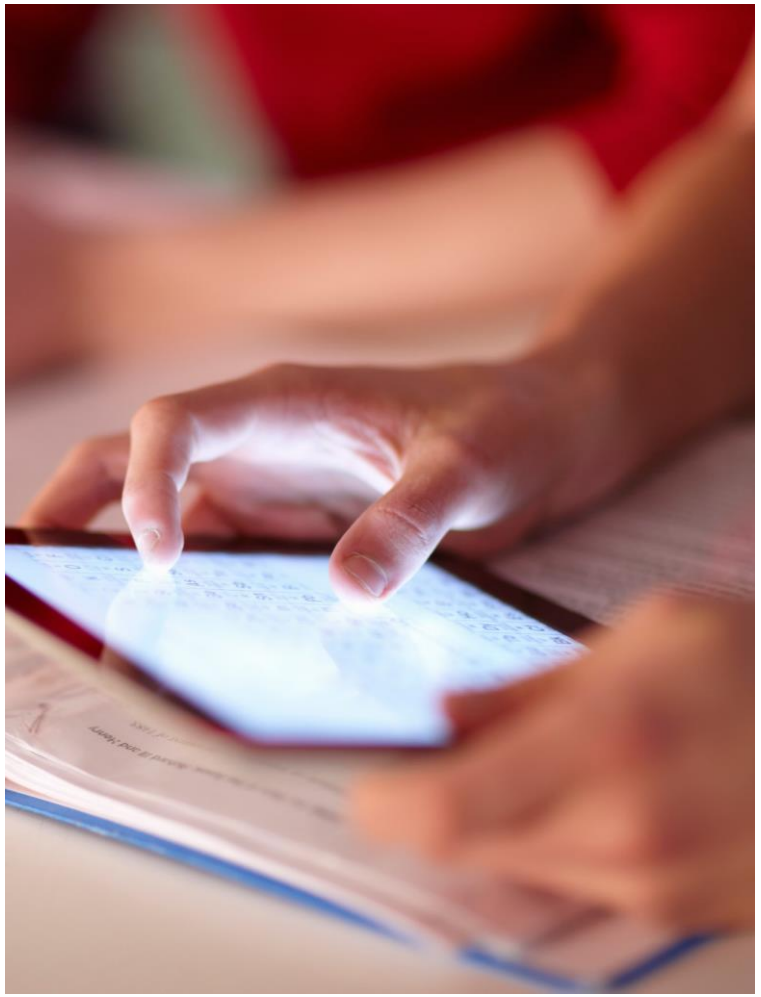




What you've learned in this unit

In this unit, you've learned:

- Basic principles of *authentication, identification, authorization*
- How to define annotations in CDS model
  `@requires`
  `@restrict`
- How to access security information in custom code
- How to configure security settings in *SAP Cloud Platform*



Further reading

Additional Material

SAP Cloud Platform:
Sign up for trial account: see course week 1 unit 2

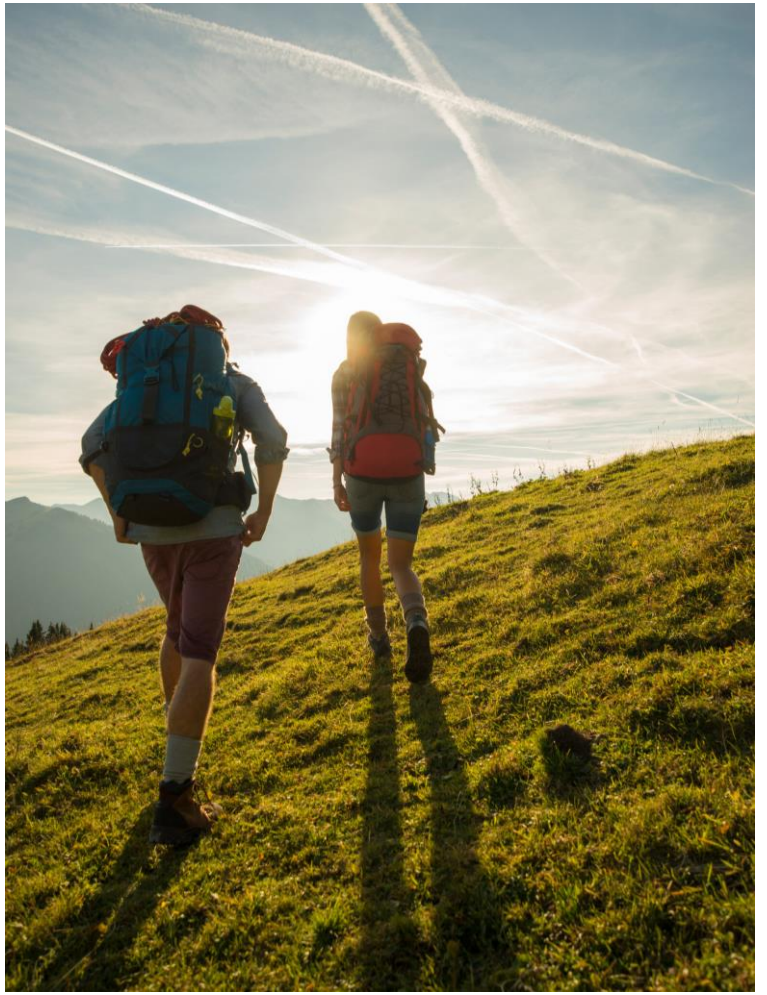
Documentation:

https://cap.cloud.sap/docs/node.js/authentication

https://cap.cloud.sap/docs/guides/authorization

SAP Help Portal:

User Account and Authentication Service



Thank you.

Contact information:

open@sap.com

Follow all of SAP

www.sap.com/contactsap

THE BEST RUN SAP®