

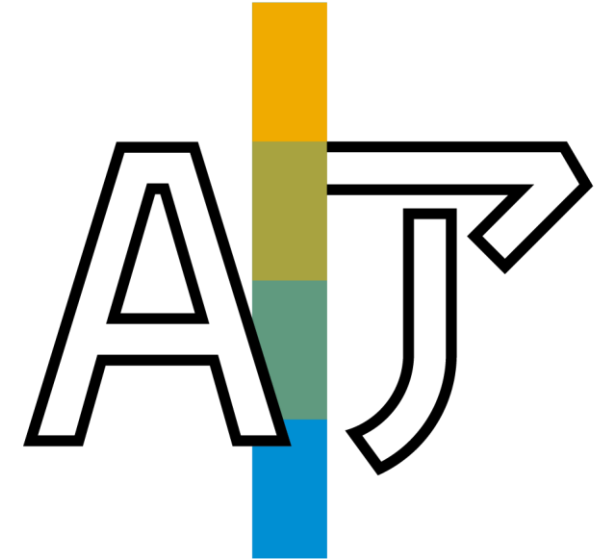


Week 1: Introducing SAP Cloud Application Programming Model

## **Unit 3: Getting Started with Core Data Services (CDS)**

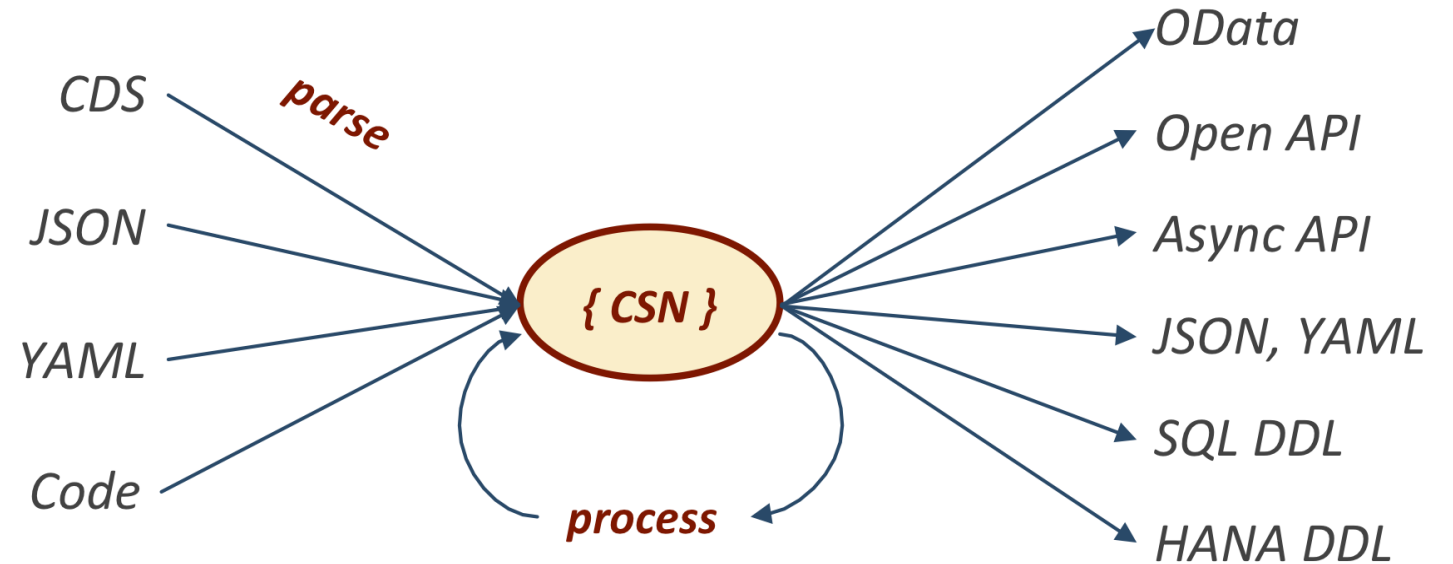
## What is CDS?

- CDS stands for Core Data Services
- It is a set of domain-specific languages
- The backbone of the SAP Cloud Application Programming Model



### What is CDS?

- Declaratively capture data models, service definitions, queries, and expressions
- JavaScript objects complying with the Core Schema Notation (CSN)
- Models can be easily created and interpreted, which fosters extensions by 3rd party contributions



# Getting Started with Core Data Services (CDS)

## Definition Language (CDL)

- Entities
- Views
- Associations
- Aspects
- Types
- Service definitions
- ... and more

```
entity Books: managed @(title: 'Bücher') {  
    key ID : UUID;  
    title  : localized String;  
    author : Association to Authors;  
}  
  
entity Authors {  
    key ID : UUID;  
    name   : String;  
    books  : Composition of many Books;  
}
```

# Getting Started with Core Data Services (CDS)

## Definition Language (CDL)

- Entities
- Views
- Associations
- Aspects
- Types
- Service definitions
- ... and more

```
entity Books as projection on db.Books;
```

```
entity Authors as projection on db.Authors;
```

```
entity Orders as SELECT * from db.Orders;
```

# Getting Started with Core Data Services (CDS)

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entity Books: managed @(title: 'Bücher') {  
    key ID : UUID;  
    title  : localized String;  
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}  
  
entity Authors {  
    key ID : UUID;  
    name   : String;  
    books  : Composition of many Books;  
}
```

# Getting Started with Core Data Services (CDS)

## Definition Language (CDL)

- Entities
- Views
- Associations
- Aspects
- Types
- Service definitions
- ... and more

```
aspect managed {  
    modifiedAt : DateTime @cds.on.update : $now;  
    createdAt  : DateTime @cds.on.insert : $now;  
    createdBy  : User      @cds.on.insert : $user;  
    modifiedBy : User      @cds.on.update : $user;  
}  
  
entity Books: managed @(title: 'Bücher') {  
    key ID : UUID;  
    title  : localized String;  
    author : Association to Authors;  
}
```

# Getting Started with Core Data Services (CDS)

## Definition Language (CDL)

- Entities
- Views
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- Types
- Service definitions
- ... and more

```
type User : String(111);

type Amount {
  value : Decimal(10,3);
  currency : Currency;
}

type Currency : Association to Currencies;

entity Order {
  buyer : User;
  price : Amount;
}
```



# Getting Started with Core Data Services (CDS)

## Definition Language (CDL)

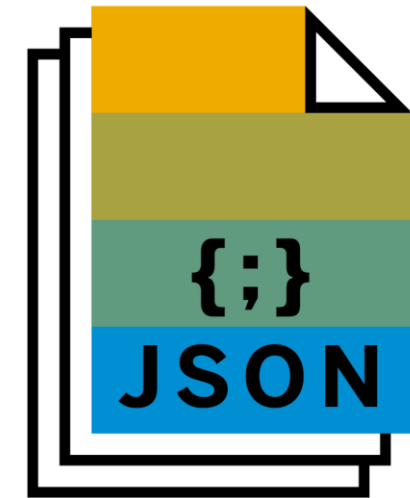
- Entities
- Views
- Associations
- Aspects
- Types
- Service definitions
- ... and more

```
service CatalogService {  
    entity Books as projection on db.Books;  
    entity Authors as projection on db.Authors;  
  
    entity Orders as projection on db.Orders {  
        *,  
        book.title,  
        book.author.name as author  
    } where createdBy = $user;  
  
    action cancel(order:UUID);  
}
```

## Getting Started with Core Data Services (CDS)

### Core Schema Notation (CSN)

- A compact JSON representations of data and service models
- Similar to JSON Schema but goes beyond with the ability to capture full-blown entity-relationship models
- Perfect source to generate target models, such as OData/EDM interfaces, as well as persistence models for SQL or NoSQL databases.

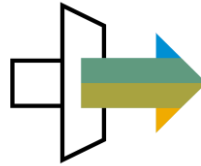


# Getting Started with Core Data Services (CDS)

## Core Schema Notation (CSN)

CDL entity into CSN example:

```
entity Books {  
    key ID : UUID;  
    title  : String;  
    author : Association to Authors;  
}
```



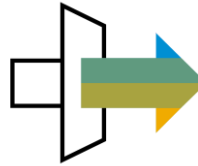
```
"Books": {  
  "kind": "entity",  
  "elements": {  
    "ID": { "key": true, "type": "cds.UUID" },  
    "title": { "type": "cds.String" },  
    "author": {  
      "type": "cds.Association",  
      "target": "Authors",  
      "keys": [ { "ref": [ "id" ] } ]  
    }  
  }  
}
```

# Getting Started with Core Data Services (CDS)

## Core Schema Notation (CSN)

CDL service with an action into CSN example:

```
service Orders {  
  
  action cancelOrder(orderID: Integer)  
  
  returns {  
  
    ack: Boolean  
  
    enum { succeeded; failed; };  
  
    msg: String;  
  
  };  
}
```



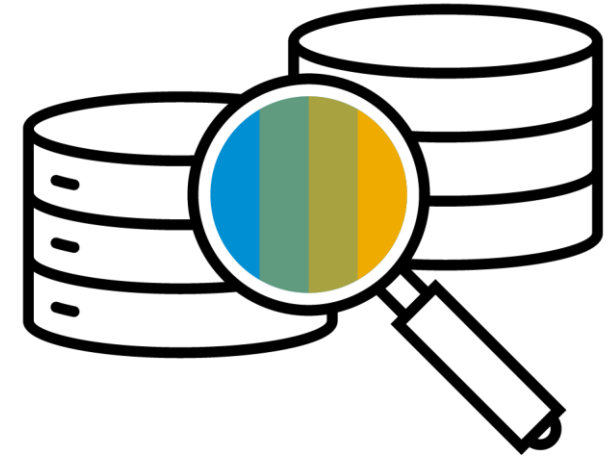
```
"Orders": {  
  "kind": "service"  
},  
"Orders.cancelOrder": {  
  "kind": "action",  
  "params": {  
    "orderID": { "type": "cds.Integer" }  
  },  
  "returns": {  
    "elements": {  
      "ack": {  
        "type": "cds.Boolean",  
        "enum": { "succeeded": {},  
                  "failed": {}  
        }  
      },  
      "msg": { "type": "cds.String" }  
    }  
  }  
}
```

## Getting Started with Core Data Services (CDS)

### Query Language (CQL)

CDS QL is based on standard SQL with some enhancements:

- Postfix projections
- Path expressions
- CDL-style casts
- Excluding clause
- Query-local mixins



## Getting Started with Core Data Services (CDS)

### Query Language (CQL)

- Postfix projections
- Path expressions
- CDL-style casts
- Excluding clause
- Query-local mixins

```
SELECT from Books { *, author.name as author};
```

## Getting Started with Core Data Services (CDS)

### Query Language (CQL)

- Postfix projections
- Path expressions
- CDL-style casts
- Excluding clause
- Query-local mixins

```
SELECT from Authors[name='Emily Brontë'].books;  
SELECT from Books:authors.towns;  
SELECT title, author.name from Books;  
SELECT from Books where author.name='Emily Brontë';
```

## Getting Started with Core Data Services (CDS)

### Query Language (CQL)

- Postfix projections
- Path expressions
- CDL-style casts
- Excluding clause
- Query-local mixins

```
SELECT from Books { stock+1 as bar : Decimal };
```



## Getting Started with Core Data Services (CDS)

### Query Language (CQL)

- Postfix projections
- Path expressions
- CDL-style casts
- Excluding clause
- Query-local mixins

```
SELECT from Books { * } excluding { author } ;
```

## Getting Started with Core Data Services (CDS)

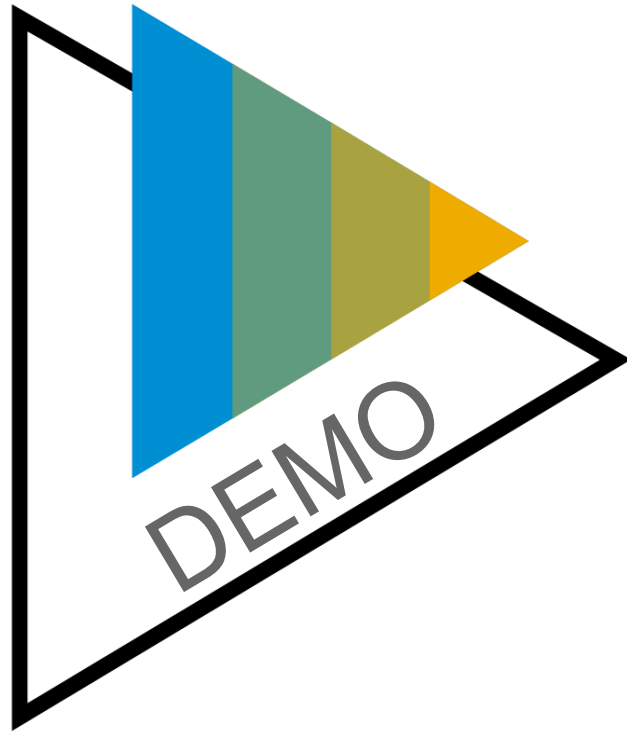
### Query Language (CQL)

- Postfix projections
- Path expressions
- CDL-style casts
- Excluding clause
- Query-local mixins

```
SELECT from Books mixin {  
  
    localized : Association to LocalizedBooks on  
localized.ID = ID;  
  
} into {  
  
    ID, localized.title  
  
};
```

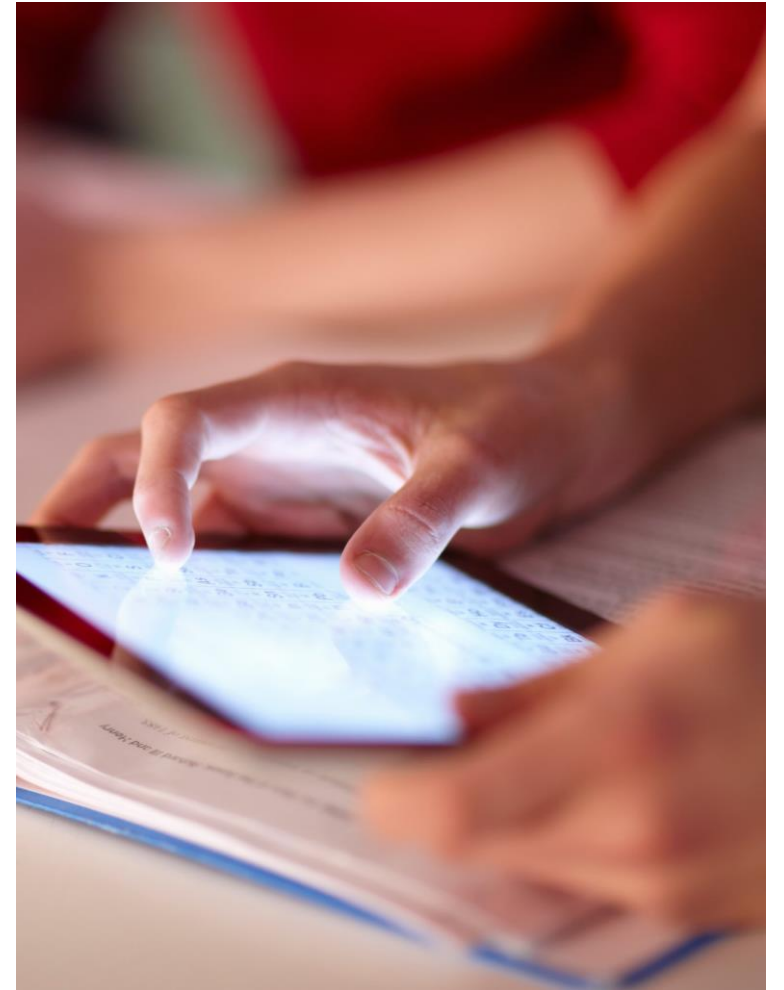
# Getting Started with Core Data Services (CDS)

## Demo



### **What you've learned in this unit**

- What CDS is
- Definition Language (CDL)
- Core Schema Notation (CSN)
- Query Language (CQL)

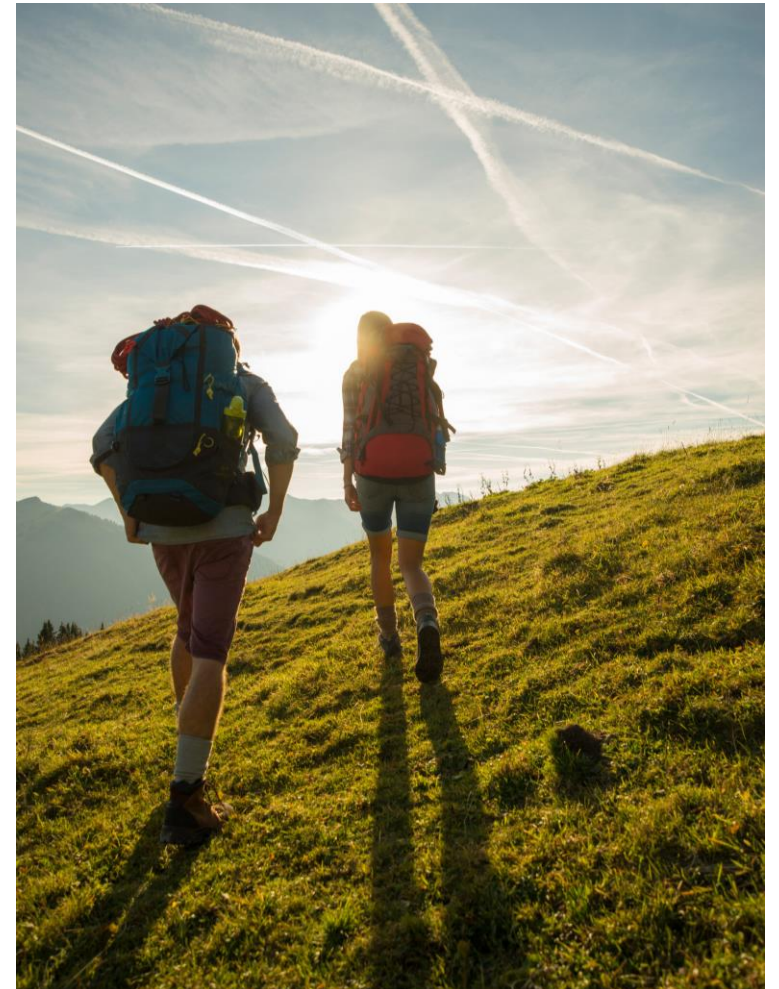


## Further reading



Additional Material

- [Official documentation](#)
- [Definition Language \(CDL\)](#)
- [Core Schema Notation \(CSN\)](#)
- [Query Language \(CQL\)](#)
- [Domain-specific languages guide](#)



# Thank you.

**Contact information:**

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