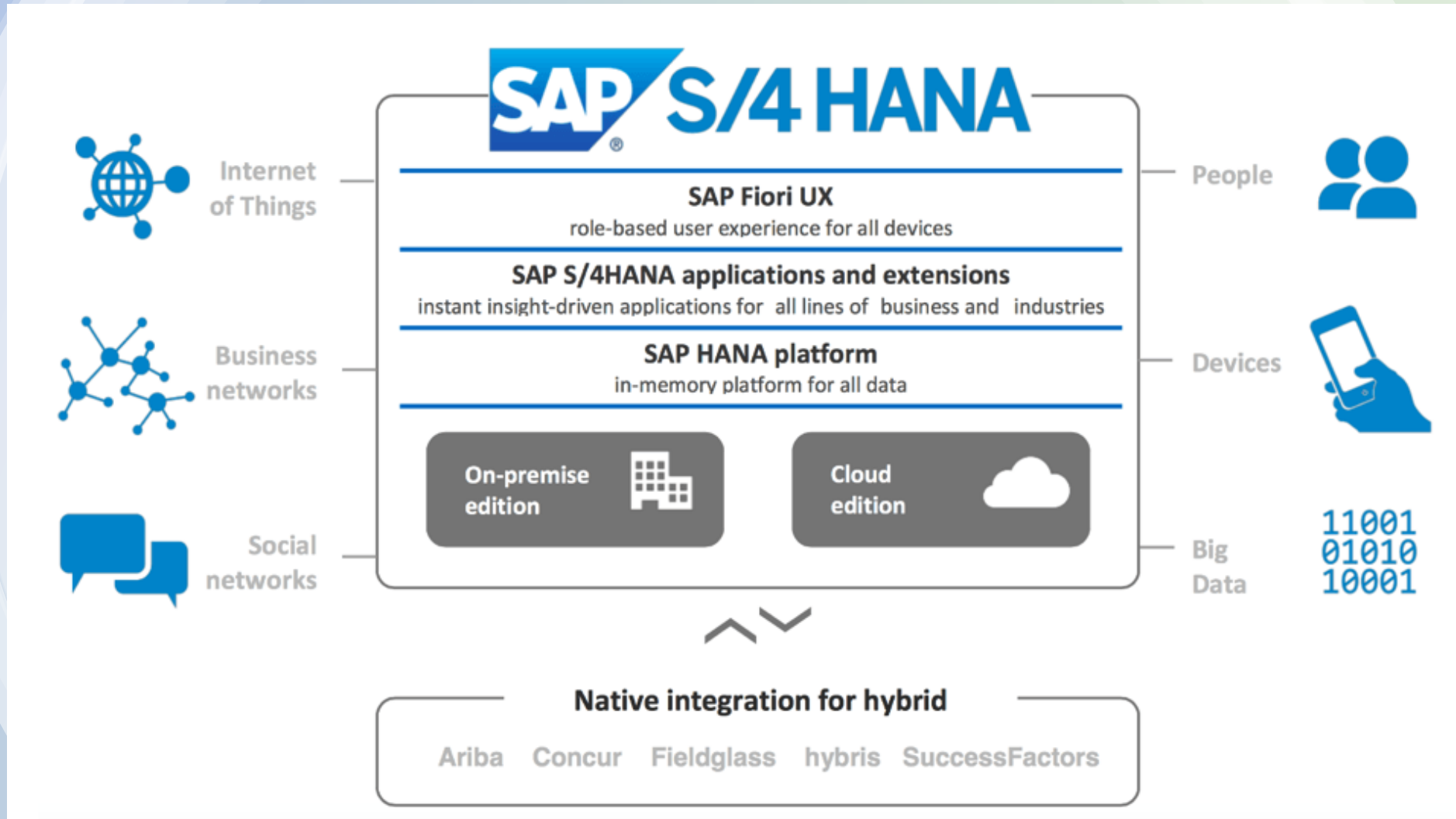# SAP OData

Presented by Wing Chan

Agenda

- What is SAP S4/Hana?

- SAP S4/Hana Features

- Architecture of SAP Cloud Platform

- What is OData?

- What is SAP OData Services?

- OData Metadata

- Querying OData

- Demo

What is SAP S/4 Hana?

SAP S/4 Hana Features

Finance
- Accounting and Financial Close
- Advanced Accounting and Financial Close
- Financial Operations
- Advanced Financial Operations
- Treasury Management
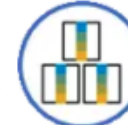- Cost Management and Profitability Analysis

Sales
- Billing
- Master Data Management
- Contract Management
- Sales Order Processing
- Claims, Returns and Refunds
- Sales Monitoring and Analytics
- Intercompany Processing
- Sales Rebates Management

Cross Area Topics
- Database Management
- Application Platform
- Enterprise Information
- Process Management and Integration
- Content, Collaboration
- Output Management

Sourcing & Procurement
- Operational Procurement
- Supplier Management
- Sourcing and Contract Management
- Central Procurement
- Procurement Analytics
- Invoice Management

Human Resources
- Core HR and Payroll
- Employee Central Payroll Integration
- Employee Integration – SAP S/4HANA Enablement
- Time Recording

Asset Management
- Preventative Maintenance
- Corrective Maintenance
- Emergency Maintenance

Professional Services
- Projects and Engagements
- Resource Management
- Service-Centric Billing
- Controlling and Accounting

Supply Chain
- Inventory
- Transportation
- Warehousing
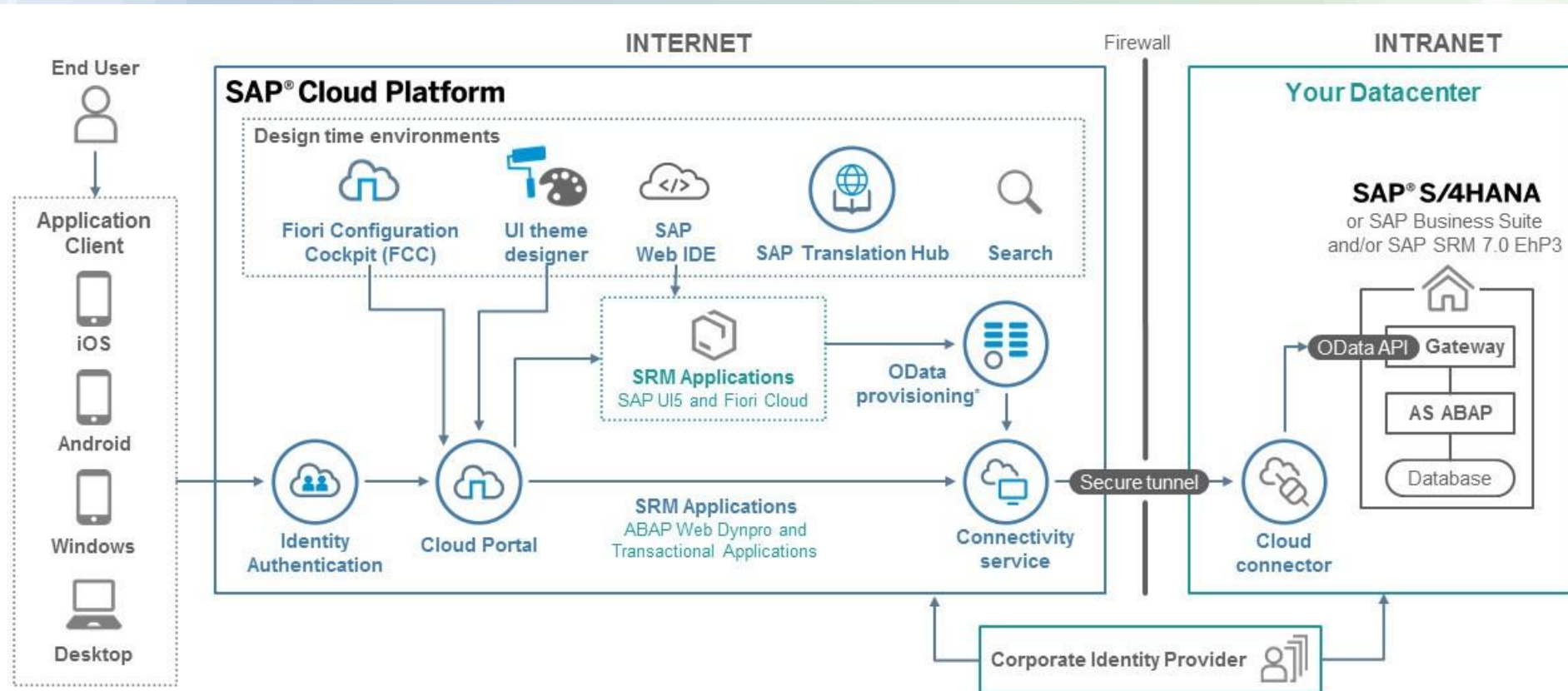- Order Promising

Manufacturing
- Production Planning
- Production Operations
- Quality Management

R&D
- Product Engineering
- Product Lifecycle Management
- Enterprise Portfolio and Project Management
- Product Compliance
- Project Control

Architecture of SAP Cloud Platform

What is OData?

- *Open Data Protocol* (OData) is an open data access protocol from Microsoft that allows the creation and consumption of query-able and interoperable RESTful APIs in a simple and standard way.

- OASIS Standard Technical Committee participants include SAP, Microsoft, IBM and Progress.

- OData v1 - v3 released in 2007 by Microsoft (Open Specification Promise)

- OData v4 released in 2014 by OASIS

What is SAP OData service?

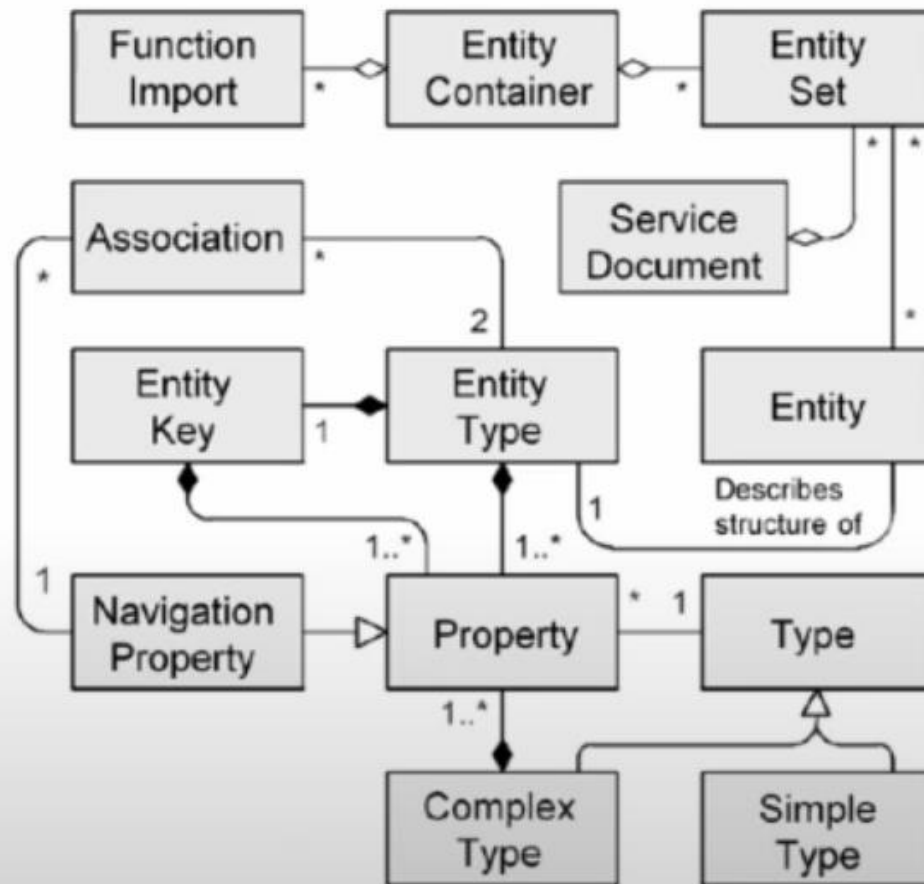- SAP provides OData service APIs to expose SAP data from S4/HANA to external applications, platforms and devices

- Advantages:
    - Obtain human readable results (view meta data in browser)
    - Use stateless applications
    - Use all web protocols standard (GET, PUT, POST, DELETE and QUERY)
    - Receive data in form of related pieces of information, one leading to another. Aka. Navigations
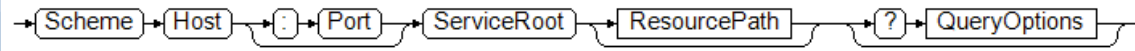
OData Metadata

Metadata document describes the types, sets, functions and actions in Entity Data Model Xml (EDMX) file format.

https://sandbox.api.sap.com/s4hanacloud/sap/opu/odata/sap/API_SALES_ORDER_SRV/$metadata


```xml
<?xml version='1.0' encoding='UTF-8'?>
<edmx:Edmx xmlns:edmx="http://schemas.microsoft.com/ado/2007/06/edmx" Version="1.0">
    <edmx:DataServices m:DataServiceVersion="1.0"
xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata">
        <Schema Namespace="ODataAPI" xmlns="http://schemas.microsoft.com/ado/2008/09/edm">
            <EntityType Name="Event">
                <Key>
                    <PropertyRef Name="EventID"/>
                </Key>
                <Property Name="EventID" Type="Edm.Int64" Nullable="false"/>
                <Property Name="Description" Type="Edm.String" Nullable="true" MaxLength
                    ="512"/>
                <Property Name="Name" Type="Edm.String" Nullable="true" MaxLength="256"/>
                <Property Name="Type" Type="Edm.String" Nullable="true" MaxLength="32"/>
                <Property Name="Country" Type="Edm.String" Nullable="true" MaxLength="256"
                    />
                <NavigationProperty Name="Features" Relationship="ODataAPI
                    .Event_Feature_Many_Many0" FromRole="Event" ToRole="Feature"/>
                <NavigationProperty Name="Sessions" Relationship="ODataAPI
                    .Event_Session_One_Many0" FromRole="Event" ToRole="Session"/>
            </EntityType>
            <EntityContainer Name="EventService" m:IsDefaultEntityContainer="true">
                <EntitySet Name="Sessions" EntityType="ODataAPI.Session"/>
                <EntitySet Name="Events" EntityType="ODataAPI.Event"/>
                <EntitySet Name="Features" EntityType="ODataAPI.Feature"/>
                <AssociationSet Name="Event_Session_One_Many0Set" Association="ODataAPI
                    .Event_Session_One_Many0">
                    <End EntitySet="Events" Role="Event"/>
                    <End EntitySet="Sessions" Role="Session"/>
                </AssociationSet>
                <FunctionImport Name="getSessionAttendeesCount" ReturnType="Edm.Int64" m
                    :HttpMethod="GET">
                    <Parameter Name="SessionID" Type="Edm.Int64" Nullable="true"/>
                </FunctionImport>
            </EntityContainer>
        </Schema>
    </edmx:DataServices>
</edmx:Edmx>
```

Querying OData

The following are two example URIs broken down into their component parts:

```
https://services.odata.org/OData/OData.svc _____/
  | service root URI
https://services.odata.org/OData/OData.svc/Category(1)/Products?$top=2&$orderby=name
_____/ _____/ _____/
                      |                          |                  |
                service root URI          resource path       query options
```

Query Option	Example	Description
$batch	/$batch	Perform several OData query, create, update or delete operations with a single HTTP POST call.
$count	/OpportunityCollection/$count	Returns the total number of Opportunities
$format	/OpportunityCollection?$format=json	Returns Opportunity entries in JSON format with server side paging
$inlinecount	/OpportunityCollection?$top=10&$inlinecount=allpages	Returns the top 10 opportunities and also returns the total number of opportunities.
$orderby	/OpportunityCollection?$orderby=CloseDate desc&$top=10	First performs an orderby on the Opportunities and then selects the top 10 from that ordered list. Here **desc** means descending order.
$search	/CustomerCollection?$search='Porter'	Returns Customer entries with at least one of the search enabled fields contain the word 'Porter'
$select	/OpportunityCollection?$select=OpportunityID,AccountID	Returns Opportunity entries but only 2 attributes OpportunityID and AccountID
$skip	/OpportunityCollection?$skip=10	Skips the first 10 entries and then returns the rest
$top	/OpportunityCollection?$top=10	Returns top 2 Opportunities. 'Top 2' is defined by server logic here

References

- OData.org
  https://www.odata.org/getting-started/basic-tutorial/#queryData

- SAP Cloud Platform Documentation
  https://help.sap.com/viewer/product/CP/Cloud/en-US

- SAP – OData everything that you need to know
  https://blogs.sap.com/2016/02/08/odata-everything-that-you-need-to-know-part-1/

- OData Query Cheat Sheet
  https://help.nintex.com/en-us/insight/OData/HE_CON_ODATAQueryCheatSheet.htm

- Simple OData Client
  https://github.com/simple-odata-client/Simple.OData.Client