ORACLE

Oracle Business Process Innovations MDM with OIC and Fan-out Pattern

Pattern Definition Document
Solution Definition and Design

9 January 2023 | Version 0.5

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VERSION CONTROL

Version	Author	Date	Comment
0.1	Peter Obert	Nov 29th, 2021	Initial version
0.2	Peter Obert	Nov 30th, 2021	Options for OIC implementation, Logical Architectures plugging in
0.3	Peter Obert	Dec 1st, 2021	Disclaimer added - still draft with many TODOs
0.4	Peter Obert	Dec 1st, 2021	The first internal review comments amendments
0.5	Peter Obert	Jan 9th, 2022	Reworked to use OCI Streaming because of deprecated OIC topics

REVIEWS

Version	Reviewer	Organization
0.3	Marcel Straka	Emerging Technology Integration Team Lead
0.4	Giovanni Conte	Requesting rework to OCI

ABBREVIATIONS LIST

Abbreviation	Meaning
OCI	Oracle Cloud Infrastructure
IDCS	Identity Cloud service
OIC	Oracle Integration Cloud
MDM	Master Data Management
API	Application Programming Interface
PaaS	Platform as a service
IaaS	Infrastructure as a service
SLA	Service Level Agreement

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NAME

Oracle Mastering Data Integration Pattern with OIC (Fan-out)

PROBLEM

This is common use-case derived from the Publish-Subscribe style and Master Data Management solutions. For example, there can be Customer Data Management (CDM) application that may contain all customer data in organization and this data needs to be synced from the Master Data application (CDM) to other applications. This is Centralized MDM. However data and business objects can be modified and published by other systems. Then we are talking about Decentralized MDM.

This document covers and generalizes only very small part of OIC Integration Capabilities - in that case it is loosely coupled Publish-Subscribe Integration style and solution derived from MDM scenarios.

OIC is toolset providing an Oracle fully managed cloud service that allows you to **integrate** your applications, **gain insight into your business processes**, **automate processes**, and **create visual applications**.

Oracle Cloud Marketplace contains a lot of **free** solutions and integration recepies that can solve the same problem scenario for the specific systems, technologies or transport protocols.

CONTEXT

At times customers may require of connecting their Oracle SaaS Master Data Management System via OIC to different SaaS, on Premise systems, other middle layers like Streaming and so on.

Examples of topics could be:

- Publish the business objects changes from the master application always loosely coupled way
- Subscribe to a SaaS related business objects changes
- Publish business objects changes to various systems or event oriented Middleware
- Orchestration of Mastered Business Objects across related Applications
- Decentralized loosely coupled Master Data Management

We can find other cases where part of that pattern or combination of the patterns can be used.

In relation to the above use cases some common implementation problem categories are:

- **Publish Enterprise Application Event**
- **Use ”Scheduled Orchestration” to capture business object changes from the systems without outbound event generation capabilities**
- **Use “App Driven Orchestration” to provide event adoption**
- **Use “Publish to OIC” integration style when creating OIC integration**
- **Use “Subscribe from OIC” integration style when creating OIC integration**
- **Use “Adapter” invocation integration to distribute the event to the target in a native way**
- **Use “App Driven Orchestration or Scheduled Orchestration” to distribute the event to the target in a native way**

SOLUTION

The way to address the described problem with the described context relies on the combination of multiple OIC components and flows. In defining the solution and the needed components it is important to have an "open & hybrid" mindset which covers Oracle technologies and third party applications and middleware styles. Being a complex solution it is better to address it driven by the **categories** defined in the "Context" section of this document.

8.1 Centralized Master Data Management

The basic concept of the Fan-out Master Data Management with OIC is describing simple solution where one system role is Centralized Data(Business Objects) Master and all the other systems are subscribed to Data(Business Objects) changes

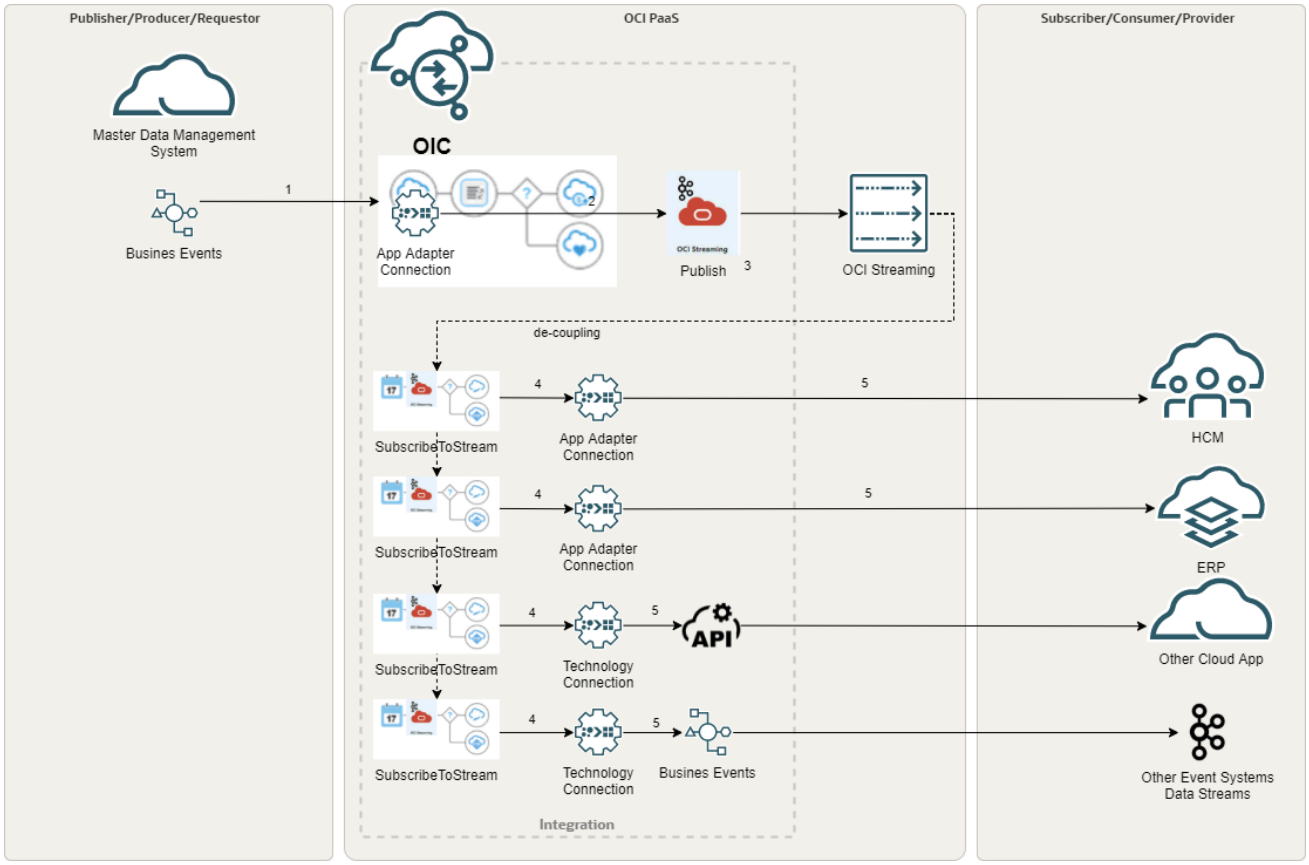

Figure 1: Centralized Master Data Management

Solution is based on following steps:

1. Event is generated from MDM. e.g. "Product Master Data Management"
2. Use "App Driven Orchestration" integration style when creating OIC integration. Application Adapter receives the Event. Event can be published for multiple subscribers to pick up using the "OCI Streaming" adapter.
3. Use "App Driven Orchestration" integration style when creating OIC integration to one of the consuming systems. OIC receives the published message from the "OCI Streaming" adapter in Step 2. This message can be optionally transformed and enriched using OIC constructs. Finally the message is handed over to Connection(Application or Technology Adapter).
4. Adapter propagates data into the Target application/platform/exposed API

8.1.1 Publish Enterprise Application Event - Options

There are 2 options for getting/registering/capturing business objects and events based on source system capabilities and data readiness:

- Use of "Scheduled Orchestration" to capture business object changes from the systems without outbound event generation capabilities**
  - There are source systems that OIC polls for the business objects changes and we need to do some enrichment or data transformation before the target systems consumption/subscription
- Use of "App Driven Orchestration" to provide event adoption through API or business object event
  - There are source systems that invokes OIC API or produces events connected to business objects changes and we need to do some enrichment or data transformation before the target systems consumption/subscription

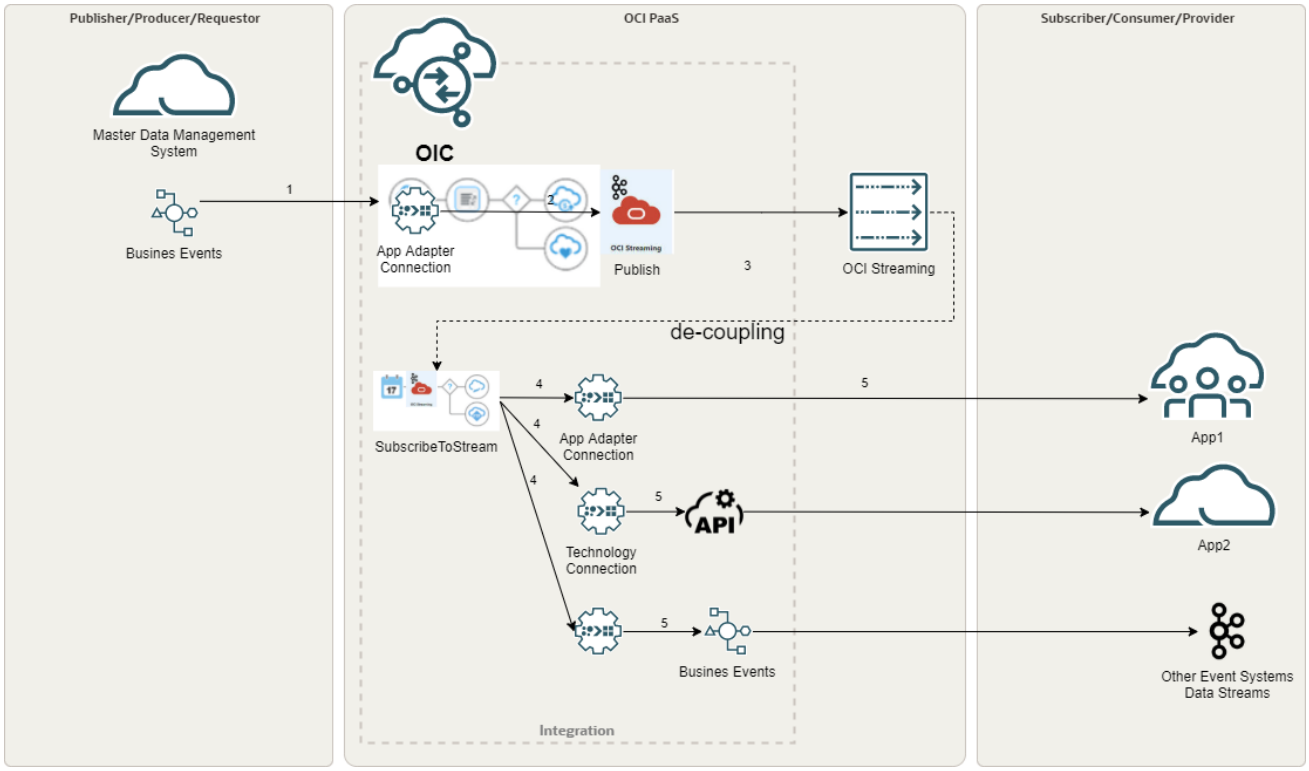

Figure 2: Publish Event/Data

8.1.2 Subscription to Enterprise Application Event - Options

There are options for delivering and consuming business objects and events based on target system capabilities, data readiness and dependencies among the systems:

- Use of "App Driven Orchestration" to subscribe to OCI Stream using "OCI Streaming adapter" as the trigger and adapt the event for consuming API or business object event
  - we can use that option if we need to do immediate event consumption. That option requires connectivity agent installation to OCI to create permanent connection to the OCI Stream. Later in the flow is possible to provide additional target system specific enrichment or system orchestration and target system is not able to consume the event/business object
- Use "Scheduled Orchestration" to distribute the event target native way and in the sequence needed to set-up dependencies among the target systems
  - that integration can be scheduled or "Trigger Now" from the MDM mastering integration flow. It is expected that "OCI Streaming" adapter invoke operation is used to consume the event from the OCI stream. Later in

the flow is possible to provide additional target system specific enrichment or system orchestration and target system is not able to consume the event/business object within one invocation or in the form of canonical form (OIC internal queue payload)

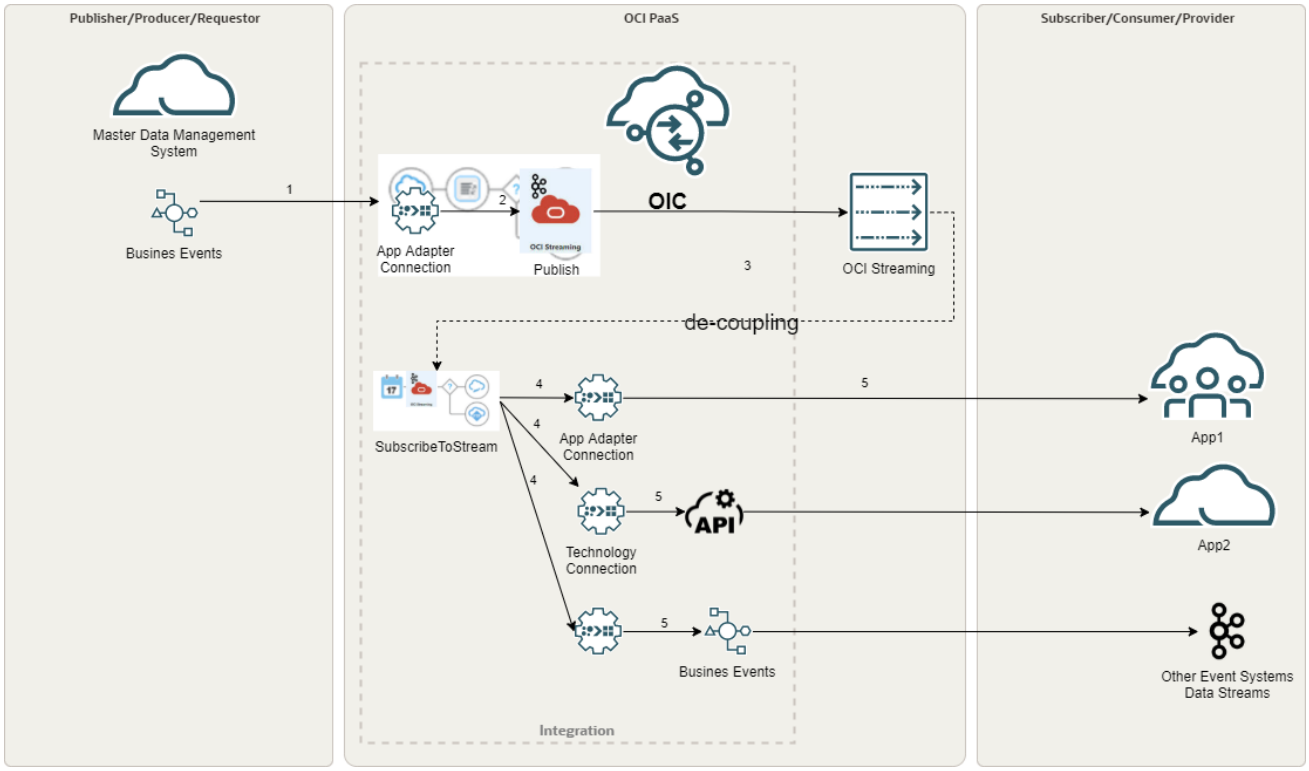

Figure 3: Subscribe Event/Data

8.2 High Level Architecture - Minimal

This integration uses case expects OIC as the platform to transform and transfer the event/business entity to the form which is possible to consume by target application or system.

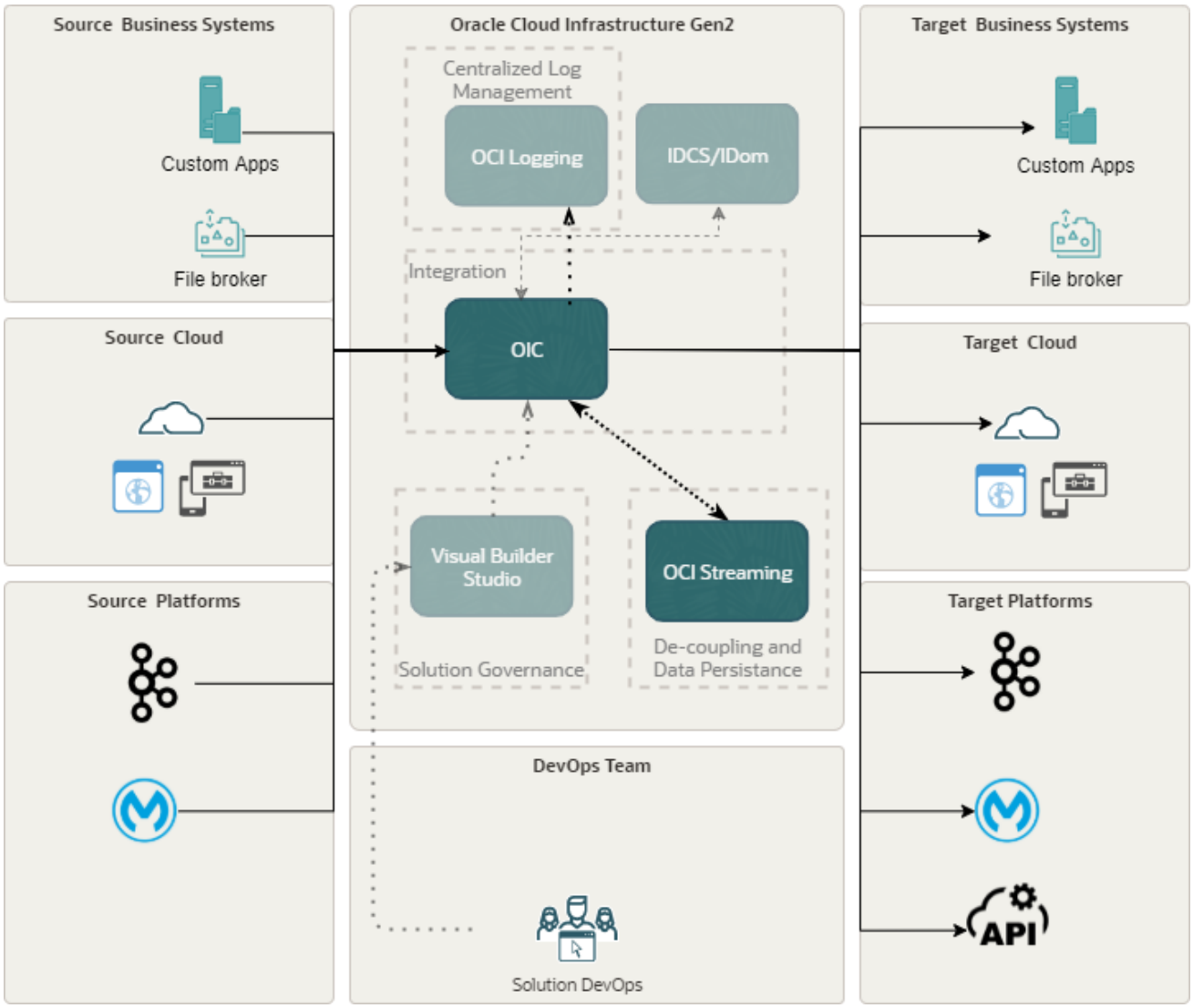

Figure 4: Logical View - Minimal

The picture above represents logical solution architecture to cover all the business aspects including **Decentralized** option of mastering the data. It means that there can be several systems in role of changing the business objects or part of the data mastered by specific system. Then the change is propagated to relevant consumers for which the new or updated information is relevant.

Target architecture benefits per Oracle Cloud Service:

- **OIC**
  - fully Oracle managed service seamlessly integrates applications and data by leveraging an extensive library of pre-built adapters
  - helps Customer to simplify all types of integrated process automation projects by leveraging pre-built integration flows and templates
  - it is low code integration and process automation tool to:

    - Accelerate integrations using a point-and-click visual designer and pre-built adapters and process flows
    - Integrate all types of applications, databases, and business processes
    - Maximize the value of your on-premise and SaaS investments by efficiently connecting data and processes across applications
- **OCI Logging Service**
  - is a highly scalable and fully managed single pane of glass for all the logs in the Customer tenancy. Logging provides access to logs from Oracle Cloud Infrastructure resources. These logs include critical diagnostic information that describes how resources are performing and being accessed. Use Logging Service to enable, manage, and search logs.
- **Visual Builder Studio(VBS)**
  - integrates a team development platform with code management and CI/CD automation
  - streamlines the development lifecycle for Visual Builder developers with project templates, environments management
  - provides build steps and CI/CD pipelines for publishing and managing
- **IAM Identity Domain**
  - An IAM identity domain is deployed with one of five identity domain types. Each identity domain type is associated with a different set of features and object limits
  - It is an Identity-as-a-Service (IDaaS) solution which provides identity management, single-sign-on (SSO) and identity governance for applications, integration services and mobile applications. It provides basic identity management functions such as user management, group management, and password management
- **OCI Streaming**
  - The Oracle Cloud Infrastructure Streaming service provides a fully managed, scalable, and durable solution for ingesting and consuming high-volume data streams in real-time. Use Streaming for any use case in which data is produced and processed continually and sequentially in a publish-subscribe messaging model.

8.2.1 High Level Architecture - Recommended

Below logical architecture diagram is representing current recommended set of Oracle Cloud Services to support more complex business use cases and variety of possible required options to orchestrate for Master Data Management and business events propagation.

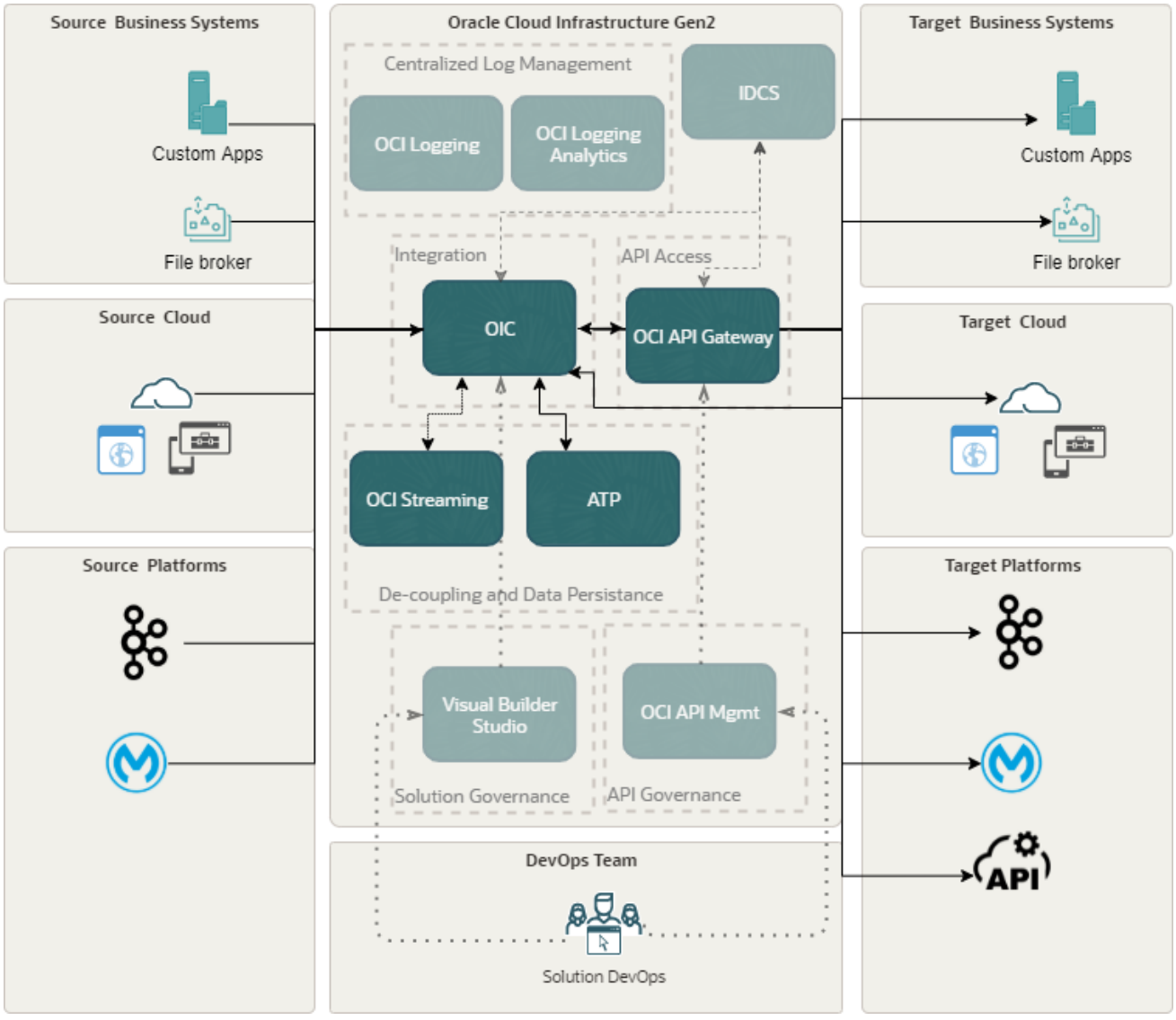

Figure 5: Logical View - Recommended

Target architecture benefits per Oracle Cloud Service:

- **OIC**
  - fully Oracle managed service seamlessly integrates applications and data by leveraging an extensive library of pre-built adapters
  - helps Customer to simplify all types of integrated process automation projects by leveraging pre-built integration flows and templates
  - it is low code integration and process automation tool to:
    - Accelerate integrations using a point-and-click visual designer and pre-built adapters and process flows
    - Integrate all types of applications, databases, and business processes

    - Maximize the value of your on-premise and SaaS investments by efficiently connecting data and processes across applications
- **OCI API Gateway**
  - isolates the service consumers/clients from how the application is partitioned into services/microservices
  - isolates the clients from the problem of determining the locations of service instances (service endpoint virtualization)
  - Provides the optimal API for each client (API contract adjustments for specific consumers)
  - Reduces the number of requests/roundtrips
  - **API Gateway can secure OCI or on Premise APIs or third party Cloud APIs** and expose it as virtualized endpoint with all the necessary API consumption Policies set
- **OCI Logging Service**
  - is a highly scalable and fully managed single pane of glass for all the logs in the Customer tenancy. Logging provides access to logs from Oracle Cloud Infrastructure resources. These logs include critical diagnostic information that describes how resources are performing and being accessed. Use Logging Service to enable, manage, and search logs.
- **OCI Logging Analytics**
  - lets you index, enrich, aggregate, explore, search, analyze, correlate, visualize and monitor all log data from OIC, API Gateway and OCI infrastructure. Contains Machine Learning Capabilities to detect anomalies ...
- **Visual Builder Studio(VBS)**
  - integrates a team development platform with code management and CI/CD automation
  - streamlines the development lifecycle for Visual Builder developers with project templates, environments management
  - provides build steps and CI/CD pipelines for publishing and managing
- **OCI Streaming**
  - The Oracle Cloud Infrastructure Streaming service provides a fully managed, scalable, and durable solution for ingesting and consuming high-volume data streams in real-time. Use Streaming for any use case in which data is produced and processed continually and sequentially in a publish-subscribe messaging model.
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  - It is an Identity-as-a-Service (IDaaS) solution which provides identity management, single-sign-on (SSO) and identity governance for applications, integration services and mobile applications. It provides basic identity management functions such as user management, group management, and password management
- **OCI API Management**
  - as the platform to accommodate API Driven development style. Complete API Lifecycle Management (including versioning, documentation, testing and packaging) solution that supports agile API development and makes it easy to keep an eye on KPIs. True hybrid API development on any cloud and on premises that is modern and adaptable, employing the most up-to-date security protocols

8.3 Combine with other patterns - Protecting API endpoints and Business Services by throttling requests

There are 2 places where is possible to do endpoint throttling for Business Services.

- The first one is directly in OIC. Compare to OSB business service throttling it needs custom implementation of the different "Parking Lot Pattern" This pattern implementation is then possible to use for Building Resilient Asynchronous Integrations
- The API gateway can be used to protect the on-premise backend APIs by limiting the rate of requests. This can be done by suitably configuring throttling policies on the API gateway deployments.

Oracle Integration Cloud (OIC) can be used to connect to an on-premise private endpoint running within customer network. Here, an OIC connectivity agent is installed within customer network. The agent executes by pulling down requests from OIC, executing them locally and then passing back the response to OIC.

DEPLOYMENT ARCHITECTURE

Following diagram shows a minimal physical representation for the OCI infrastructure can be required for the pattern MDM.

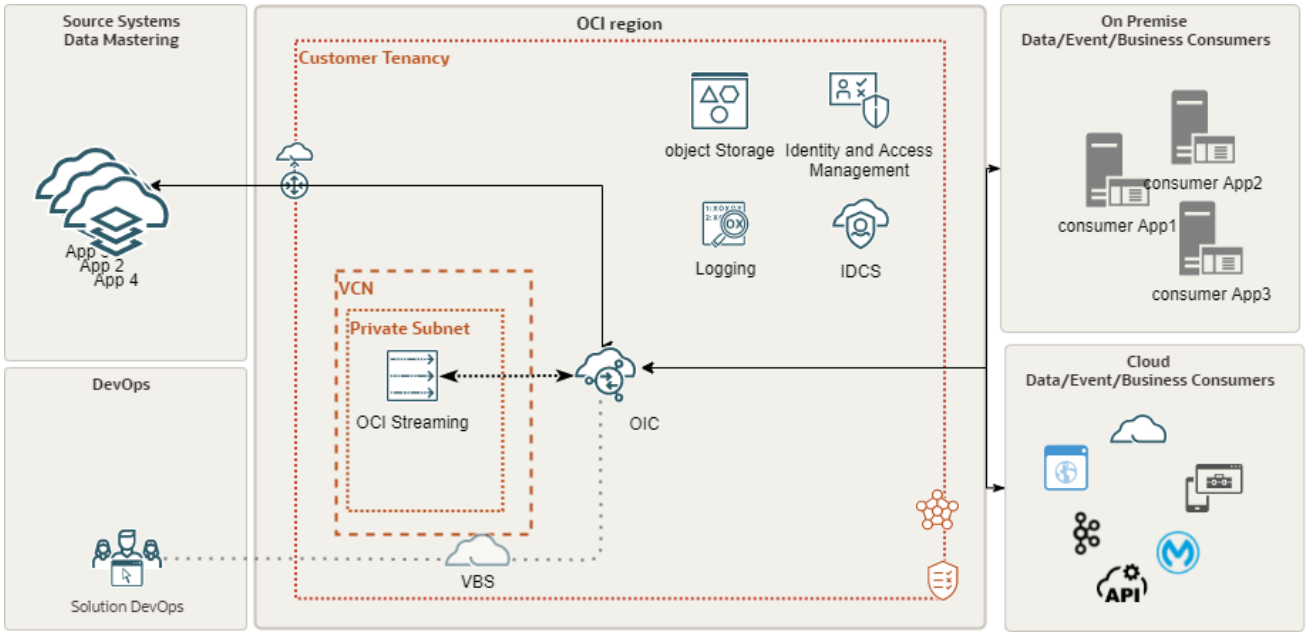

Figure 6: Deployment View - Minimal

Deployment view does not contain the need of a VCN and subnets

- private subnet to house the OCI Streaming services
- public subnet to house optional API gateway instance for the recommended full architecture with OCI API Management

For simplicity we recommend to start creation of the VCN using the VCN Wizard. Choose to create a "VCN with Internet connectivity" This will automatically create a VCN that includes all of these:

- VCN
- Public subnet
- Private subnet
- Internet gateway (IG)
- NAT gateway (NAT)
- Service gateway (SG)

Following diagram shows a recommended physical representation for the OCI infrastructure for the pattern MDM.

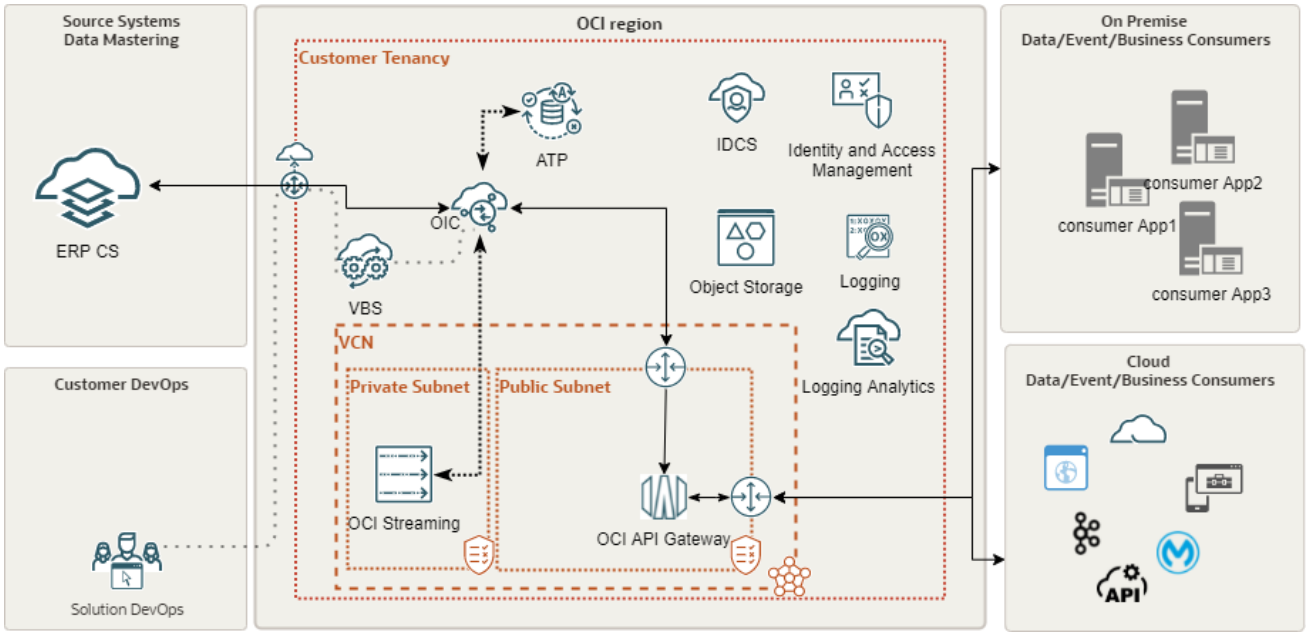

Figure 7: Deployment View - Recommended

REFERENCES

This pattern is registered and some diagrams and patterns to combine with you can find in A-Team Chronicles