

ASYNCHRONOUS OPEN APIS FOR EVENT BASED ARCHITECTURES

CATALYST URN: C22.0.305

- **Champions:** *BT, CityFibre, Jio, Orange, Telenor, Verizon and Vodafone*
- **Vendors:** *Aria, Bit2win*
- **System Integrators:** *EPAM, Tech Mahindra and Yupiik*

Overview

Communication Service Providers (CSP) today are radically adapting their BSS architectures for the autonomous zero-touch digital era. Fueled by new networks designed to deliver partner applications and serve enterprise needs, their IT ecosystems are growing fast and requiring greater interoperability with many more internal and external stakeholder systems. Profits are dependent on the ability to coordinate digitally in the era of “connected everything” and B2B2X business models.

The TM Forum has made significant progress in defining Open APIs to enable these connections to be standardized and autonomous. However, TM Forum Open APIs are defined around the REST standard for synchronous and tightly integrated architectures. For some use-cases, an asynchronous, event-based architecture may be a better alternative to enable a more loosely coupled solution that:

- 1) **Lowers the time and cost of integrating new components and best-of-breed capabilities to support agile innovation.** For example: integrating a new AI-driven channel engagement solution for an alternative route-to-market.
- 2) **Enables more performant sharing of data and events.** For example, immediately advising multiple partners and systems of a network outage issue.
- 3) **Reduces dependency on a centralized business process orchestration authority,** enabling external business units and/or localized component level innovation and autonomy as a federated architecture.

As a result, many CSPs are evaluating and incorporating event-based architectures into their strategies, as is commonly found in the internet industry. To assist with this adoption, this catalyst looks at how standardized TM Forum Open APIs can also be used in an AsyncAPI format with an accompanying interaction pattern to support process assurance.

CATALYST OBJECTIVES AND DELIVERABLES

The objective of this catalyst is to trigger the standardization of an event-based version of the Open APIs by the TM Forum, with subsequent support by CSP vendors and solution providers.

This catalyst delivers:

- Suggested tooling to convert RESTful Open APIs to AsyncAPIs Open APIs.
- A defined structure and interaction pattern for event queues to support both event notifications and event responses.
- Proof, through demonstration, that several independent ODA components and vendor solutions can successfully interoperate using an event-based architecture.

OUTLINE CONCEPT

Functional ODA components, either as individual system components or components suites, delivered by best-of-breed vendor systems interoperate on a business process (for example 'new product order') via event queues. See TMFC0XX modules in Figure 1.

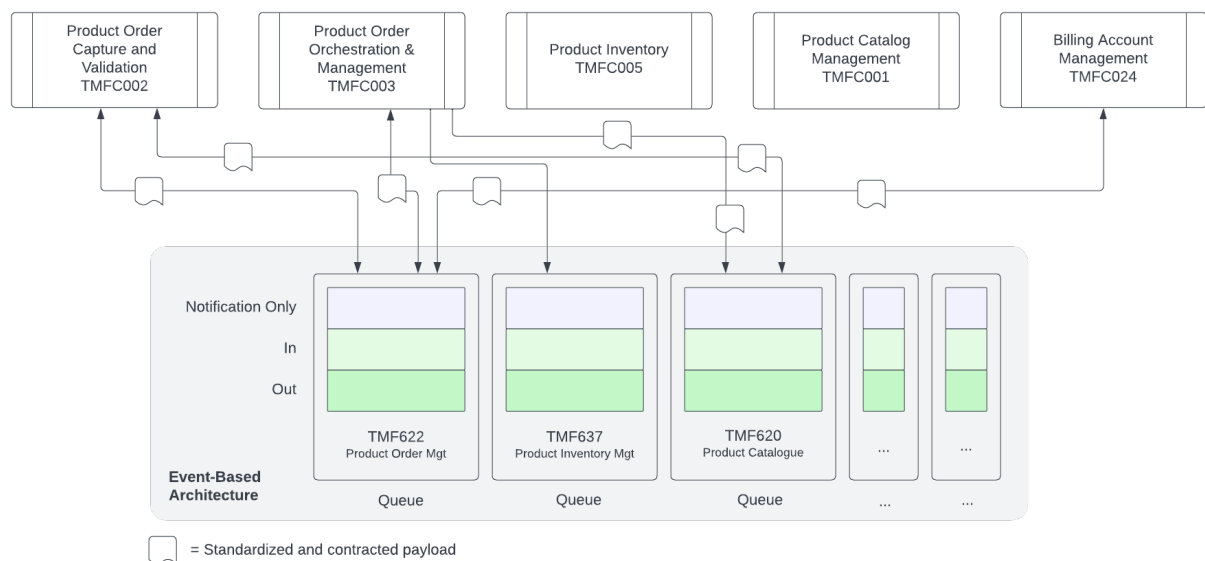


Figure 1 - Event-based architecture outline example

There is an event queue for each TM Forum Open API in the Event-Based Architecture (Figure 1). The queues are structured to support simple notifications ('Notification Only') from components and request/responses between ODA components ('In/Out'). For example,

the 'In/Out' enables ODA components to update other ODA components on progress or a state change.

The payload for each queue interaction is standardized according to the conversion of existing TM Forum REST APIs (OAS3.0) to the AsyncAPI format, so it forms a SID-level contract of understanding between ODA components.

The 'event titles' are structured by this catalyst to help guide ODA components listening on the queues on the value and appropriateness of the event to their needs without having to process the event first.

The following sequence diagram provides an example interaction as to how this architecture may operate for a 'new product order' use-case (UC008 outlined in [TM Forum IG1228](#)):

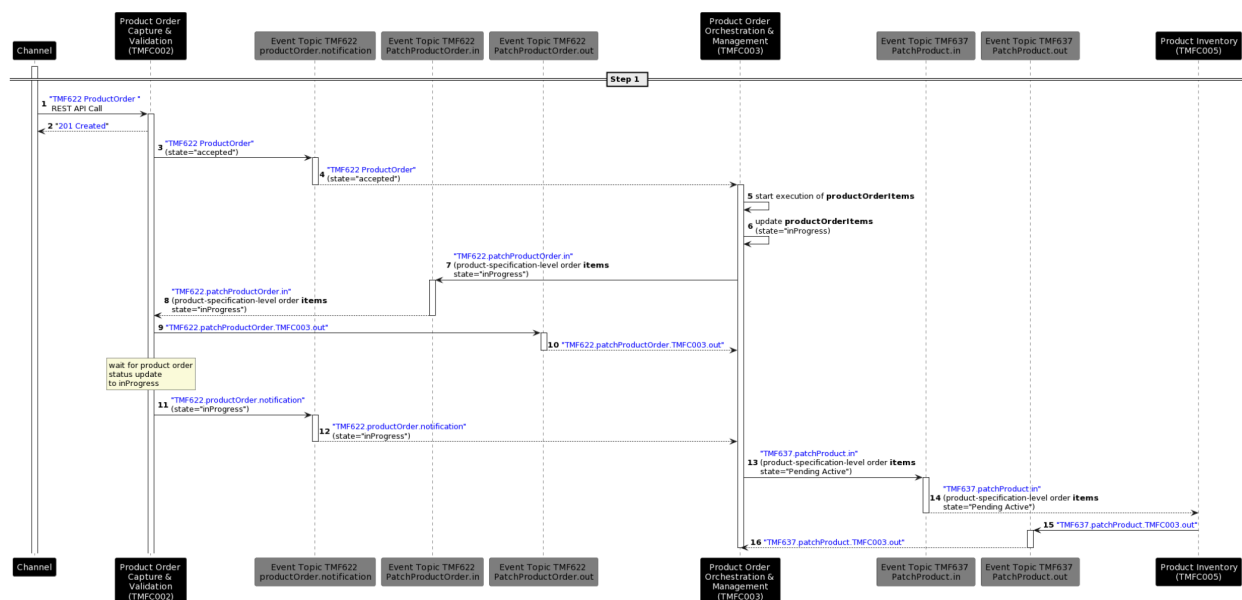
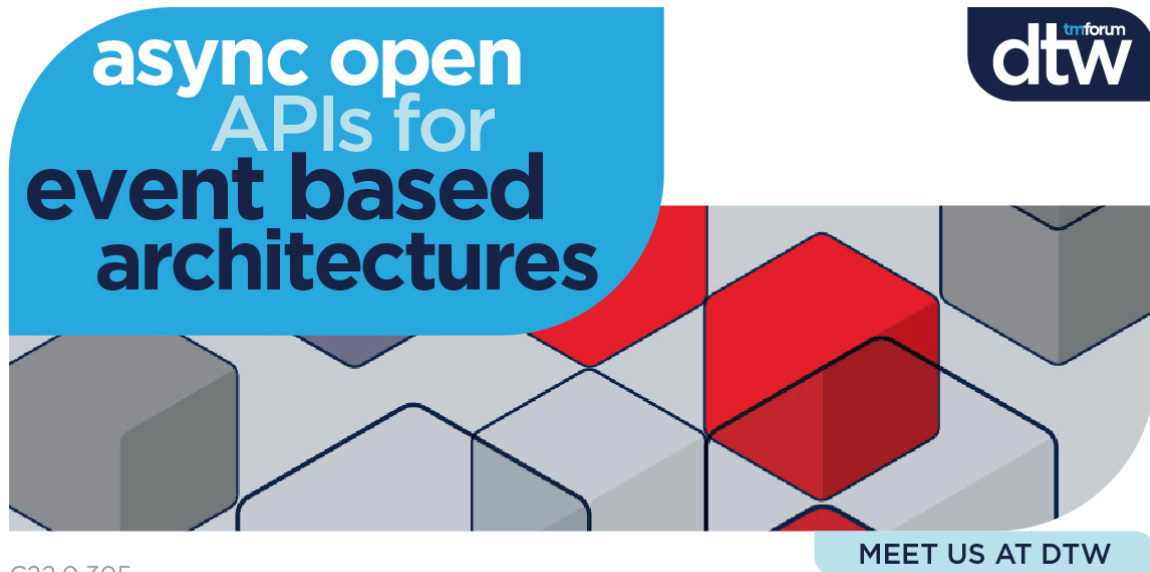


Figure 2 - New Product Order Sequence Diagram (UC008)

The TMForum CurateFx Digital Transformation Project Tool details the use-case, eco-system business model, and impact on stakeholders, products, and services in more detail here: <https://curatefx.tmforum.org/#/projects/2691>.



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MEET US AT DTW

DIGITAL TRANSFORMATION WORLD 2022 SHOWCASE

The catalyst will be presented in the Innovations Lab Arena at [DTW 2022](#), covering:

- Business use-cases by BT, CityFibre and Verizon
- Introduction to event-based architectures
- TM Forum standardization
- Lessons learned and next steps

Catalyst URN: [C22.0.305](#)

Date: Tuesday, 20 September

Time: 5.45 – 6.05pm

The catalyst is demonstrated on **Kiosk #: IL-10** and includes the following:

- Use-Case: Customer Order-to-Cash Process in UC008 from [TM Forum IG1228](#)
- Event Queue Technology: Kafka
- Public Cloud Environment: Confluent
- Component Providers; Aria Systems, Bit2Win, CityFibre, EPAM, Tech Mahindra and Yupiik