The Open Group Snapshot

IT4IT™ Reference Architecture, Version 3.0: Managing Digital Excerpt

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Preface

The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through technology standards. Our diverse membership of more than 800 organizations includes customers, systems and solutions suppliers, tools vendors, integrators, academics, and consultants across multiple industries.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

- Working with customers to capture, understand, and address current and emerging requirements, establish policies, and share best practices

- Working with suppliers, consortia, and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies

- Offering a comprehensive set of services to enhance the operational efficiency of consortia

- Developing and operating the industry's premier certification service and encouraging procurement of certified products

Further information on The Open Group is available at www.opengroup.org.

The Open Group publishes a wide range of technical documentation, most of which is focused on development of Standards and Guides, but which also includes white papers, technical studies, certification and testing documentation, and business titles. Full details and a catalog are available at www.opengroup.org/library.

The Open Group IT4IT™ Forum

The IT4IT Forum, a Forum of The Open Group, enables industry thought leaders to collaborate in the development of the IT4IT Reference Architecture standard for business benefit.

The mission of this Forum is to create and drive the adoption of the IT4IT Reference Architecture standard to manage the business of IT, enable business insight across the IT value chain, increase focus on business outcomes, and improve agility.

Participation in the IT4IT Forum enables IT practitioners, consultants, technology and training vendors, service providers, business managers, and academics to come together in a technology-agnostic, industry-agnostic, and vendor-neutral environment to solve shared IT management challenges. Participants in the IT4IT Forum Work Groups benefit as they:

- Increase their depth of knowledge of the standard and how to use it to benefit their organization

- Gain early access to the latest thinking, before it gets published broadly to the world

- Learn from collaborating with others and networking with industry thought leaders and competitors

- Build personal relationships and contacts that will be of benefit long into the future

- Take advantage of opportunities to build a personal brand and develop professionally

For further information, visit www.opengroup.org/IT4IT.

This Document

This is a Snapshot document of the IT4IT Reference Architecture, Version 3.0, a draft Standard of The Open Group. It is being developed by The Open Group.

The purpose of this document is to disseminate information on the current direction and thinking in advance of formal publication of the IT4IT Reference Architecture, Version 3.0 which is currently under development.

Version 3.0 will supersede the current Version 2.1. The IT4IT Reference Architecture, Version 3.0 is expected to be released during 2021.

This document is structured as follows:

- Chapter 1 provides a high-level introduction to the IT4IT Reference Architecture

- Chapter 2 provides definitions for this document

- Chapter 3 introduces the concept of the Digital Product and the Digital Product Backbone

- Chapter 4 discusses the value streams a Digital Enterprise requires to manage the new digital ecosystem and to continuously deliver value to the business and its customers

- Chapter 5 provides an overview of the Level 1 Reference Architecture, defining the building blocks (capabilities and components) needed to enable the various value streams

- Appendix A provides an overview of the anticipated changes to the Reference Architecture, Version 3.0

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Referenced Documents

The following documents are referenced in this Snapshot document.

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

- ArchiMate 3.1 Specification, The Open Group Standard (C197), November 2019, published by The Open Group; refer to: www.opengroup.org/library/c197

- Digital Practitioner Body of Knowledge™ Standard (also known as the DPBoK™ Standard), The Open Group Standard (C196), January 2020, published by The Open Group; refer to: www.opengroup.org/library/c196

- Service Brokering with the IT4IT™ Standard, The Open Group Guide (G18F), December 2018, published by The Open Group; refer to: www.opengroup.org/library/g18f

- The Open Group IT4IT™ Reference Architecture, Version 2.1 (C171), January 2017, published by The Open Group; refer to: www.opengroup.org/library/c171

- The Shift to Digital Product, White Paper (W205), December 2020, published by The Open Group; refer to: www.opengroup.org/library/w205

- The TOGAF® Standard, Version 9.2, The Open Group Standard (C182), April 2018, published by The Open Group; refer to: www.opengroup.org/library/c182

- Why Business and IT Must Co-Create Strategy for a Digital Enterprise, White Paper (W203), January 2020, published by The Open Group; refer to: www.opengroup.org/library/w203

1 Introduction

1.1 Objective

The objective of this Snapshot document is to:

- Disseminate information on the current direction and thinking to an interested audience in advance of formal publication of the IT4IT Reference Architecture, Version 3.0

- Solicit feedback and comment with a view to further enhance and tune the content for Version 3.0

This Snapshot document does not cover the full IT4IT Reference Architecture. It is intended to make public the direction and thinking about the most important changes we are making in the development of the IT4IT Reference Architecture, Version 3.0. We invite your feedback and guidance. To provide feedback on this Snapshot document, please send comments by email to ogspecs-snapshot-feedback@opengroup.org no later than July 30, 2021.

1.2 Overview

The IT4IT Reference Architecture, a Standard of The Open Group, is a powerful tool for aligning and managing a Digital Enterprise. Its flexible, value stream-based approach supports your digital business wherever you are in your journey and wherever you want to go, regardless of whether your primary business outcome is better, faster, cheaper, safer, or some combination of all four.

Designed as an umbrella framework, the IT4IT Reference Architecture is useful for companies addressing many of today's challenges, whether it be moving to the cloud, deploying Agile or DevOps, undergoing a Digital Transformation, or moving to a product-centric operating model. With a focus on the information needed to manage Digital Products and the flow of data between management systems, the IT4IT Reference Architecture is process-agnostic and useful for businesses of all sizes and industries.

The IT4IT Reference Architecture provides a "standard, repeatable model" for creating a digital delivery model. It is intended to help organizations adapt to changes in technology, process, and methods without having to re-factor the management architecture to accommodate every shift.

The IT4IT Reference Architecture:

- Provides a vendor-neutral, technology-agnostic, and industry-agnostic reference architecture for managing the digital ecosystem, enabling insight for continuous improvement

- Provides the capabilities for managing Digital Products in a better, faster, cheaper way with less risk

- Provides prescriptive guidance on the specification of and interaction with a consistent Service Model (common data model/context)

- Supports real-world use-cases driven by the digital economy (e.g., cloud-sourcing, Agile, DevOps, and service brokering)

- Embraces and complements existing process frameworks and methodologies (e.g., ITIL®, CoBIT®, SAFe®, Scrum, DevOps, Continuous Delivery (CD), The Open Group DPBoK™ and TOGAF® Standards) by taking a data-focused implementation model perspective, essentially specifying an information model across the entire value chain

- Is industry-independent to solve the same problems for everyone

- Is designed for managing digital as well as managing the existing hybrid landscapes in a multi-vendor ecosystem

1.2.1 Version 3.0 Themes

The influx of digital technology in nearly all areas of business has led to a new digital paradigm where traditional business and IT practice are converged. The business has become digitalized and the "business of IT" cannot exist in isolation both as a practice and as an organization. IT organizations have embraced becoming an integral part of the business value creation and are currently transforming their IT operating model to introduce new ways of working as well as modernizing their IT management tooling landscape.

The IT operating model is transitioned into a digital operating model which should be designed for managing digital, and leveraging Agile development, CD, and DevOps. At the same time the digital ecosystem is changing where organizations need to effectively broker and integrate digital services from an increasing number of cloud service providers and other business partners in their business model.

The IT4IT Forum embraces these developments. The updated IT4IT Reference Architecture provides prescriptive, holistic guidance for the implementation of digital management capabilities for the Digital Enterprise as part of the converged business ecosystem. The IT4IT Forum identifies the following themes as part of the IT4IT Reference Architecture, Version 3.0:

- Shift to Digital Product (delivered as a service) to bring IT and business together – see also The Open Group White Paper: The Shift to Digital Product (see Referenced Documents)

- Embracing DevOps practices to enable scalable, integrated, and automated value streams

- Extending the IT value chain concept to a Digital Value Network (where value is created through collaboration with many parties in the digital ecosystem through exploration, iterative development, and continuous improvement)

- Balancing speed and risk in digital delivery (ensuring security, risk, and compliance is embedded in the digital delivery model)

- Service brokering in a multi-vendor cloud ecosystem

- Alignment with other Standards of The Open Group, such as the TOGAF Standard, the DPBoK Standard, and the ArchiMate® Specification

Managing Digital Products and services throughout their evolving lifecycle is becoming a critical business capability to succeed in this digital era. A digital management capability organized around value streams is becoming foundational to business success. The IT4IT Reference Architecture, Version 3.0 has been designed to manage this new digital ecosystem and to guide this transformation of the IT function into a digital delivery model, co-creating Digital Products that interact with all involved stakeholders in the new digital ecosystem including business, consumers, and external vendors and service providers.

IT4IT Forum publications (see Referenced Documents) related to these themes are:

- Service Brokering with the IT4IT™ Standard, The Open Group Guide

- The Shift to Digital Product, The Open Group White Paper

- Why Business and IT Must Co-Create Strategy for a Digital Enterprise, The Open Group White Paper

1.3 Conformance

This is a Snapshot document, not an approved standard. Do not specify or claim conformance to it.

1.4 Normative References

None.

1.5 Terminology

For the purposes of this document, the following terminology definitions apply:

Can   Describes a possible feature or behavior available to the user or application.

May   Describes a feature or behavior that is optional. To avoid ambiguity, the opposite of "may" is expressed as "need not", instead of "may not".

Shall   Describes a feature or behavior that is a requirement. To avoid ambiguity, do not use "must" as an alternative to "shall".

Shall not   Describes a feature or behavior that is an absolute prohibition.

Should   Describes a feature or behavior that is recommended but not required.

Will   Same meaning as "shall"; "shall" is the preferred term.

1.6 Future Directions

The IT4IT Reference Architecture, Version 3.0 is expected to be released during 2021.

2 Definitions

For the purposes of this Snapshot document, all terms are as defined in the Merriam-Webster's Collegiate Dictionary.

3 Introducing the Digital Product

3.1 Summary

This chapter describes how a Digital Product can be viewed as the single, simple, unifying element to manage digital technology and "smart" products and services. It forms the basis of what to manage in the shift to product thinking to support modern Agile and DevOps management practices, and integrates traditional product management acumen with IT management disciplines.

Figure 1: Digital Product

Managing the Digital Product Portfolio applies to product lines for both internal and external consumers. The Digital Product is intended to be used as the basis of the IT4IT Reference Architecture, in describing and implementing an effective lifecycle management discipline. The concept of a Digital Product combines elements from an end-to-end IT operational management model and the traditional concerns of IT Service Management (ITSM) with the financial and marketing concerns of traditional product management. Product management and IT management roles will converge and unite into a new competency called Digital Product Management.

3.2 Digital Products

As technology-enabled products and services become the norm in every market in the digital economy, IT and business leaders work together as active participants in managing the full lifecycle of technical and financial outcomes of every business investment, with a common understanding of the underpinning IT4IT "factory" and a clear line of sight to customer value.

Product management disciplines are now the focus, and in the foreground for management needs. Product management is a proven and mature competency with established roles, activities, frameworks, lifecycle management approaches, and so on that are standardized. By adopting "product" as a governing metaphor, IT also adopts a vocabulary that will improve communication between business and IT and understanding of value, cost, risk, and profit as applicable.

The IT4IT Reference Architecture is part of the solution set that supports Digital Transformation, connecting proven IT management practices with newer methods into the new Digital Product Management competency.

The IT4IT Reference Architecture defines Digital Product to highlight the distinction between digital and non-digital products and provides clarity about use of this term, both in an IT management context and when describing the universe of "smart" products with embedded code ranging from roller bearings to jet engines and self-driving cars.

The following definition for Digital Product is proposed:

"*A service, physical item, or digital item that provides an agreed and specific outcome for a consumer; that incorporates and requires software to realize that outcome; that is expected to require active management of the software by the provider over its lifecycle; and that is described by a formal offer of value to be provided in exchange for an explicit price.*"

The criteria for a Digital Product are that it:

- **Must** include one or more Service Offers which define the contract options for consumers

- **May** be delivered as a Digital Product instance as described in a contract-based Service Offer – the Digital Product instance **may** include a product service system containing IT, non-IT resources, and software

- **May** be consumed within an organization or externally

- **May** have dependencies on other Digital Products

- **Must** provide interactions via machine and/or human interfaces

Digital Product Management must address two lifecycle concerns that map to the IT4IT value streams:

- **System lifecycle** – the managed digital technology component of the product

- **Contract lifecycle** – governs consumed instances, warranties, commitments, and dependent systems
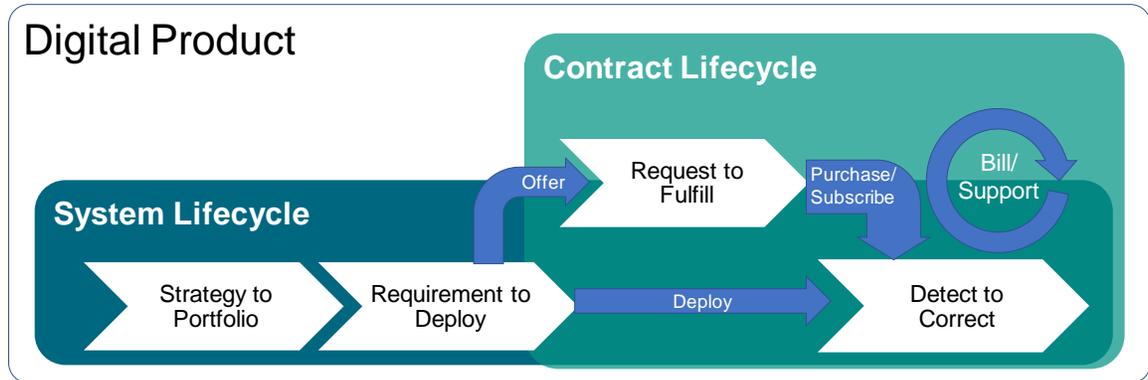
The IT4IT Value Streams Strategy to Portfolio, Requirement to Deploy, Request to Fulfill, and Detect to Correct are part of The Open Group IT4IT™ Reference Architecture.

Figure 2: Digital Product Lifecycle

3.3 Digital Product Backbone

The Digital Product Backbone supports organizational transformation into a cooperative Digital Product Management discipline. It provides a language for describing Digital Product Management and value streams that resonates with modern IT methods in keeping with the semantics of the digital age and product management.

The Service Model Backbone concept part of the IT4IT Reference Architecture, Version 2.1 has been incorporated into the Digital Product Backbone, as visualized in Figure 3.
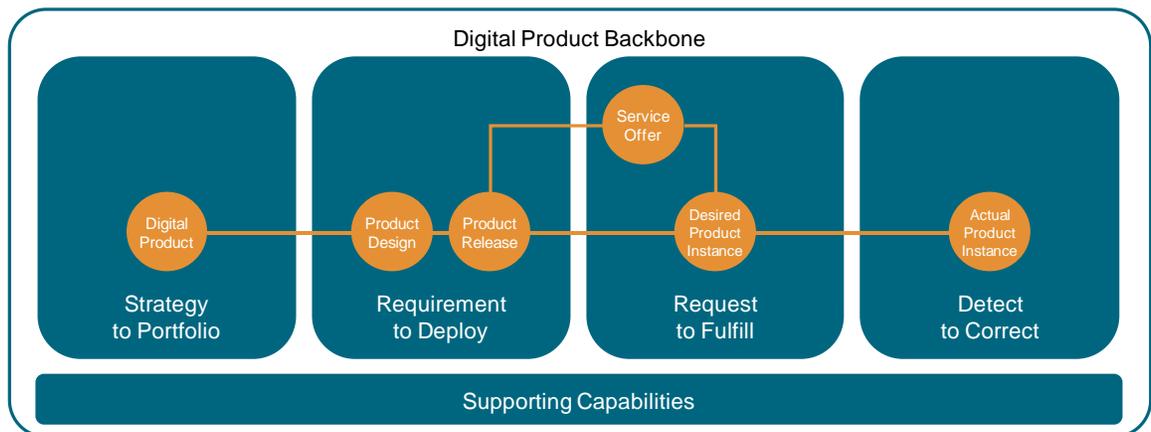
Figure 3: Digital Product Backbone

The Strategy to Portfolio capability provides the ability to identify and manage the portfolio of Digital Products. These products are designed and created using the Requirement to Deploy capability resulting in Product Releases. The Product Releases are deployed using the Request to Fulfill capability resulting in deployed instances registered as a Desired Product Instance and Actual Product Instance. The Detect to Correct capability monitors and maintains the Actual Product Instance (and may detect configuration drift).

The Digital Products will be provided as a service to the consumers. The consumption of digital services is enabled by the creation and publication of various Service Offers. Service Offers are the orderable items related to a Digital Product, such as service activation through a self-service

portal or by using APIs initiated through a Continuous Integration/Continuous Delivery (CI/CD) pipeline.

The Desired Product Instance and Actual Product Instance represent the entire stack and configuration of a deployed product in an operational environment.

Table 1 shows the proposed name changes from the Service Model Backbone data objects to the Digital Product Backbone data objects.

Table 1: Digital Product Backbone Data Objects Evolved from the Service Model Backbone

IT4IT RA Version 3.0 Concept	IT4IT RA Version 2.1 Concept	Comments
Digital Product	Conceptual Service	The Conceptual Service is replaced by the concept of a Digital Product (and Digital Product Management).
Product Design	Logical Service	A Digital Product can have one or more Product Designs.
Product Release	Service Release	A Digital Product has one or more Product Releases (with an associated Product Design).
Service Offer	Offer	A Product Release can have one or more Service Offers associated with it which define the consumption interactions consumers can initiate/perform.
Desired Product Instance	Desired Service	This represents the complete stack of a configured and deployed instance of a Digital Product (desired state configuration).
Actual Product Instance	Actual Service	This represents the actual configuration of the deployed instance of a Digital Product and its entire stack of configuration items as part of the system.

4   Digital Value Network – Value Streams and Capabilities

This chapter provides an overview of the capabilities and value streams which are defined at Level 0 of the IT4IT Reference Architecture.

At Level 0 the following concepts are introduced as part of the overall Digital Value Network:

- Level 0 capabilities (top-level capabilities)

- Value streams

Figure 4 shows the Level 0 capabilities as part of the Digital Value Network, which manages and governs the lifecycle of all Digital Products within the Digital Product Portfolio.
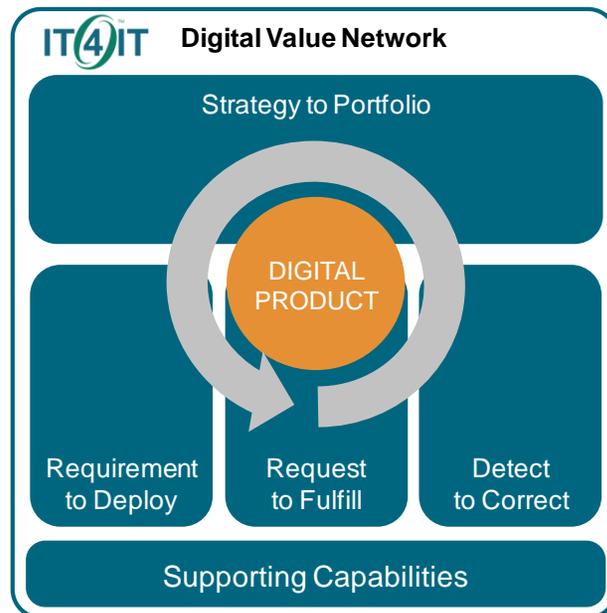
Figure 4: Value Streams and Capabilities

The four value streams as part of the IT4IT Reference Architecture, Version 2.1 will be defined as the Level 0 capabilities. These capabilities are further decomposed into functional components in Level 1 of the IT4IT Reference Architecture. Capabilities provide an abstraction of what is needed to manage the new digital reality in a way that helps to simplify conversations between interested stakeholders. A capability is a particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome.

The Level 0 capabilities of the Digital Value Network are:

- Strategy to Portfolio (S2P)

- Requirement to Deploy (R2D)

- Request to Fulfill (R2F)

- Detect to Correct (D2C)

In Version 3.0 several new value streams are introduced which integrate several capabilities and components into an end-to-end journey, as shown in Figure 5.
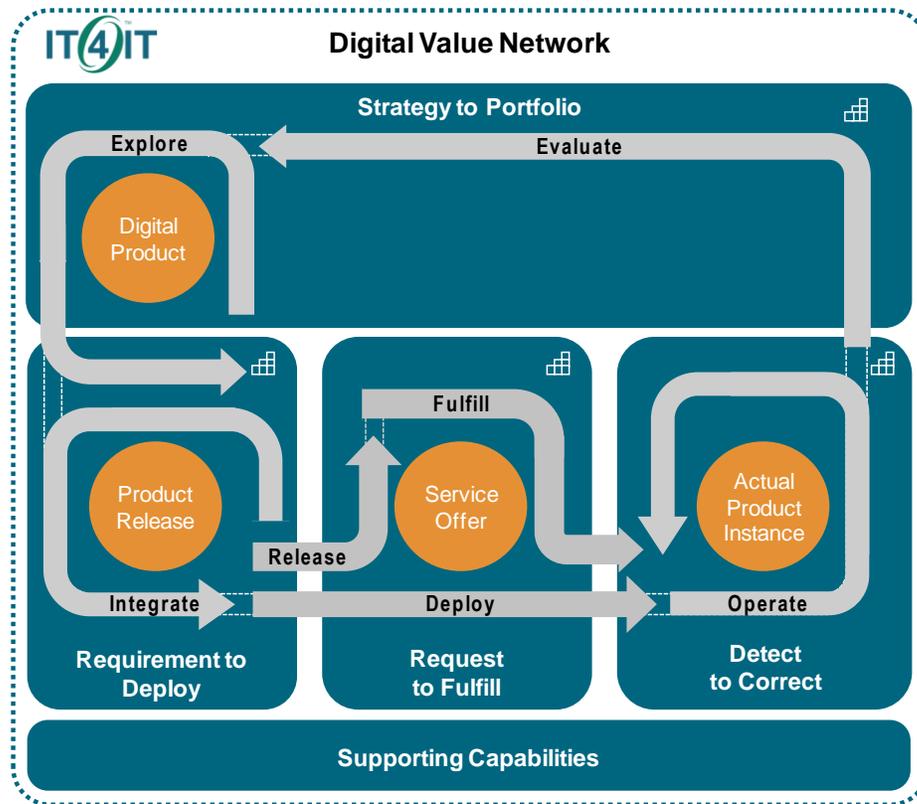
Figure 5: Capabilities and Value Streams

A value stream represents a sequence of activities that creates an overall result for a customer, stakeholder, or end-user. The complete set of value streams depicts the various ways in which an organization orchestrates its capabilities to create stakeholder value through Digital Products. The value stream has a direct linkage to an organization's business model (specifically to the value proposition). As an organization translates its business model to an operating model, those value stream stages can be translated into digital delivery processes as well as related data objects, tools, integrations, etc.

The IT4IT Reference Architecture, Version 3.0 defines the following seven value streams:

- Evaluate Digital Product Portfolio

- Explore Digital Product

- Integrate Product Release

- Release Service Offer

- Deploy Product Release

- Fulfill Service Offer

- Operate Actual Product Instance

These value streams will be briefly introduced and described in the following sections.

4.1 Evaluate Digital Product Portfolio

This value stream is about continuous assessment and evaluation of the entire Digital Product Portfolio to optimize the portfolio aligned with business strategy, policies, and objectives.

This evaluation determines how well the business model, value streams, customer journeys, and business capabilities are enabled by the Digital Products in terms of value, risk, cost, user experience, etc. to identify improvements and new opportunities.

The outcome of this value stream is the proposed architectural changes, demands, and ideas consolidated into a rationalized Portfolio Backlog, covering Portfolio Backlog Items such as:

- Opportunities to introduce new Digital Products

- Opportunities to simplify and/or rationalize the portfolio

- Opportunities to improve/enhance value streams and end-to-end customer journeys

- Opportunities to improve/enhance current Digital Products

4.2 Explore Digital Product

This value stream continuously explores new features and/or future directions of a Digital Product aligned with strategic direction and business needs. It ensures the Product Design evolves to facilitate innovation and optimize business outcome.

Several variations of this value stream can be differentiated:

- Explore the feasibility of a new Digital Product; e.g., by creating a prototype and validating the business case (innovation)

- Explore modifications and enhancements of an existing Digital Product; e.g., validate modifications to the Product Design

- Explore the design of an end-to-end customer journey which is enabled by multiple Digital Products

Activities as part of the value stream include:

- Observe and conduct research to understand business demands and challenges

- Generate ideas and opportunities for improvement

- Build a new Product Design (e.g., prototype)

- Validate and collect feedback

- Create or update the product vision and roadmap

This value stream uses practices such as design thinking, Lean UX, and Lean Startup to explore new products and new product features. The outcome of this value stream is one or more validated new Product Designs.

4.3   Integrate Product Release

This value stream continuously designs and builds new Product Releases ready for consumption by the market or business.

This value stream is responsible for the development, configuration, or integration of an initial or new version of a Digital Product, approved by the product owner. The new version of the Product Release may also be the result of an emergency fix needed for a current production version. The Product Release is not limited to software development; this value stream is also applicable to development of infrastructure building blocks and workplace services.

The outcome of this value stream is a validated and tested Product Release which can support one or more Service Offers.

Activities as part of this value stream include:

- Identify and prioritize product features and stories as part of the release

- Plan iterations/sprints

- Manage requirements

- Design and develop the new Product Release (and Service Offers)

- Integrate the various components into a Build Package

- Test and validate the release

4.4   Release Service Offer

Products are delivered for consumption as services. This value stream publishes a new or modified Service Offer to consumers. A Service Offer defines how you can subscribe to a service, as well as all other lifecycle interactions a service has with its consumers and stakeholders. The Service Offer is published in a Service Offer Catalog which can be made available for consumption through a self-service portal or through APIs.

This value stream is responsible for ensuring that the digital Service Offers for a new, a change to, or decommissioning of a digital service or its support to them are offered to existing and potential customers. This value stream maintains the Service Offer Catalog, the Catalog views, and the Service Offer promotion and information of available Service Offers to the consumer base so the individual consumer can find and request services or support. Service Offers should be made available for viewing and requesting access over multiple channels, supporting the click, call, and face principles. The starting point for releasing new Service Offers is:

- The Product Release as the result of the Integrate Product Release value stream, or

- The decision of the product manager to provide a new (bundled) Service Offer based on existing Service Offers and Product Releases, or

- The decision to change or terminate an existing Service Offer

4.5 Deploy Product Release

This value stream enables the instantiation of a Product Release into an operating environment (creating a new instance or updating an existing instance), so it can be released to the customer on-demand. The removal or disposal of an installed Product Release is also covered by this value stream. Many possible strategies for deploying Product Releases can be implemented using this value stream; for example, to a targeted audience, or using a dark launch in which functionality is not released to consumers. If the user requirements and/or the characteristics of the Digital Product necessitate that it is improved, released, and deployed frequently, this will drive the need to automate this value stream. To comply with regulatory requirements, many organizations require approvals and a track record of all the changes made in the production environment. This value stream ensures that all changes are tracked and related to a specific Product Release.

The result of the deployment is a modified Desired Product Instance and Actual Product Instance (and related configurations).

Examples of value stream scenarios are:

- Deploy a new Product Release into a test, acceptance, or production environment

- Deploy an emergency fix (e.g., to resolve a problem and/or vulnerability)

This value stream combined with the Integrate Product Release value stream enables the full CI/CD pipeline of continuously building, integrating, and deploying releases across the different environments.

4.6 Fulfill Service Offer

This value stream offers desired Digital Products to entitled consumers or system actors. It supports customer self-service and is not limited to a single engagement channel. This value stream orchestrates everything that is required to fulfill the consumption for an offered service, and it ensures that the desired Digital Product will be delivered within the agreed terms. The value stream is responsible for all activities needed to deliver Digital Products successfully or provide support to consumers.

An order from the Service Offer Catalog can be initiated through various channels such as self-service portal, virtual assistant, or through an API. This value stream orchestrates all activities needed to fulfill the Service Offer.

Examples of value stream scenarios are:

- Onboard a new employee (to orchestrate all related onboarding activities such as creating an identity/user account, email account, mobile phone, laptop, access to business applications, etc.)

- Subscribe to a digital service (such as an SaaS application)

- Request the provisioning of standard infrastructure products (e.g., using infrastructure as code)

- Modify existing subscription (e.g., add/remove capacity)

4.7   Operate Actual Product Instance

This value stream ensures continuous operations of a deployed instance of a Digital Product. A deployed instance represents the entire product stack referred to as the Actual Product Instance. The Actual Product Instance consists of all configuration items that are part of a deployment, as well as its integrations and dependencies with other systems and components.

This value stream ensures the availability and performance of Actual Product Instances within the boundaries of their agreed Service Contract and Key Performance Indicator (KPI) targets. The scope of this value stream includes managing any compliance and security aspects of running Digital Product instances and underlying systems that may result from deployment and/or fulfillment. This is achieved using integrated, automated, or fully autonomous data flows between the event monitoring, event, incident, change, configuration, and problem management functions of the digital services. In addition, the data flows may be designed to be reactive, proactive, or predictive and include a retrospective.

Examples of value stream scenarios:

- Proactively detect and resolve issues before the business is impacted (e.g., using service failure prediction by leveraging AI/ML)

- Provide self-help to consumers to resolve issues (e.g., using a self-help portal, virtual assistant, or community support)

- Coordinate the remediation of major incidents (e.g., using swarming techniques)

- Detect and respond to security events and vulnerabilities

5 IT4IT Reference Architecture, Level 1 Overview

This chapter provides an overview of all capabilities, functional components, and the essential data objects as part of the IT4IT Reference Architecture, Level 1.

At Level 1 the following concepts are introduced:

- Functional components (part of the capabilities)

- Product lifecycle data objects (key data objects)

- Digital Product Backbone data objects (evolved from the Service Model Backbone)

- Supporting capabilities

- Relationships

Each of these four capabilities encapsulates all the sub-capabilities and components necessary to manage aspects of the product lifecycle. These capabilities are realized as a set of functional components and data objects. The functional components within the four capabilities are responsible for creating, refining, and tracking key data objects across the full product and service lifecycle. The relationships between the data objects that pass between the functional components during the product lifecycle are well defined.
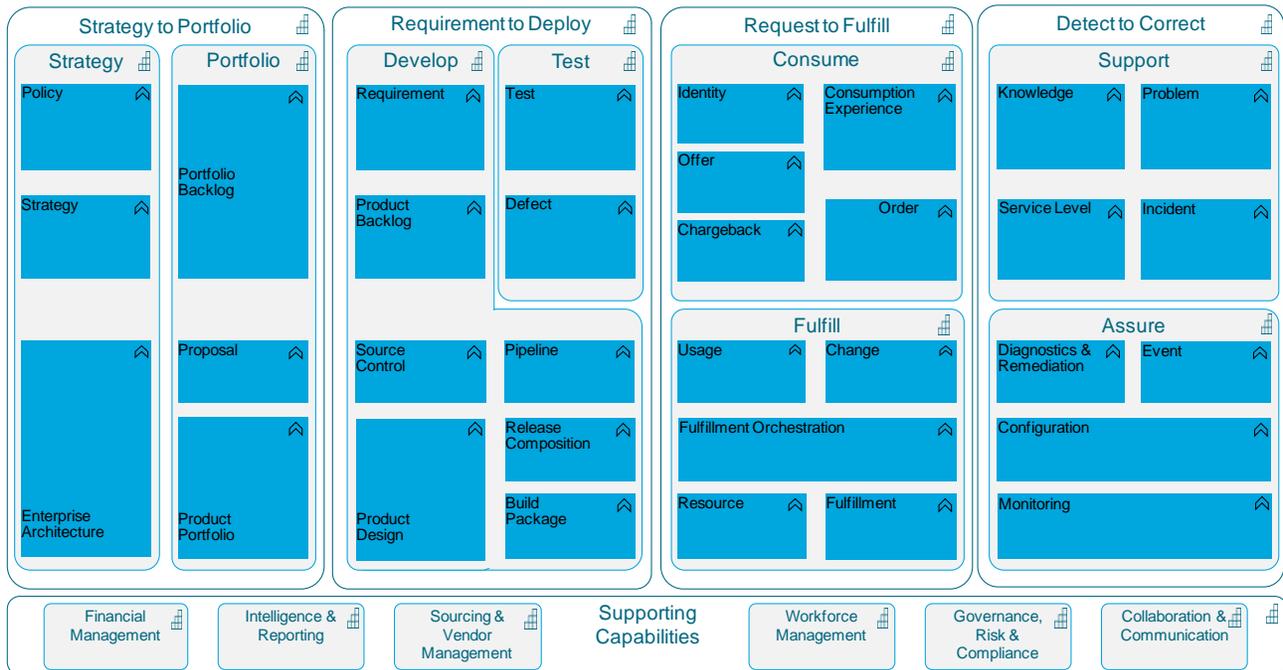
Figure 6: Overview of Version 3.0 Functional Components and Supporting Capabilities

Functional components are the smallest technology unit that can stand alone and be useful as a whole to a customer.

Data objects represent tangible, non-trivial data items that are owned, consumed, produced, or modified by the functional components.

Functional components have defined input(s) and output(s) that are data objects, and must change or advance a key data object (e.g., state change).

Figure 7 shows the essential product lifecycle data objects as part of the functional components.

Figure 7: Overview of the Product Lifecycle Data Objects

Figure 8 shows the essential data relationships to enable end-to-end traceability and visibility across the different value streams.
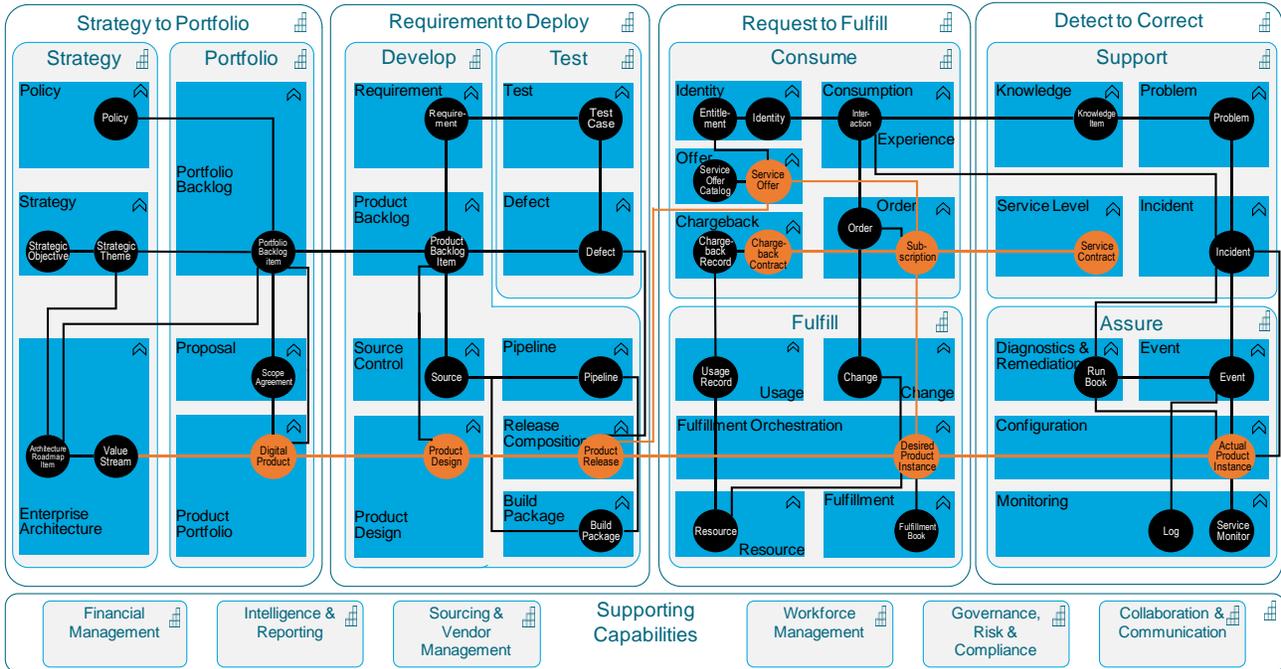
Figure 8: High-Level Overview of Value Stream Data Relationships

5.1 Strategy to Portfolio

The Strategy to Portfolio (S2P) capability is the "plan" part of the Digital Value Network. This capability contributes to the business strategy and planning of portfolio activities. It includes "what" a business needs to do to bring an idea from Strategy into the Product Portfolio as an i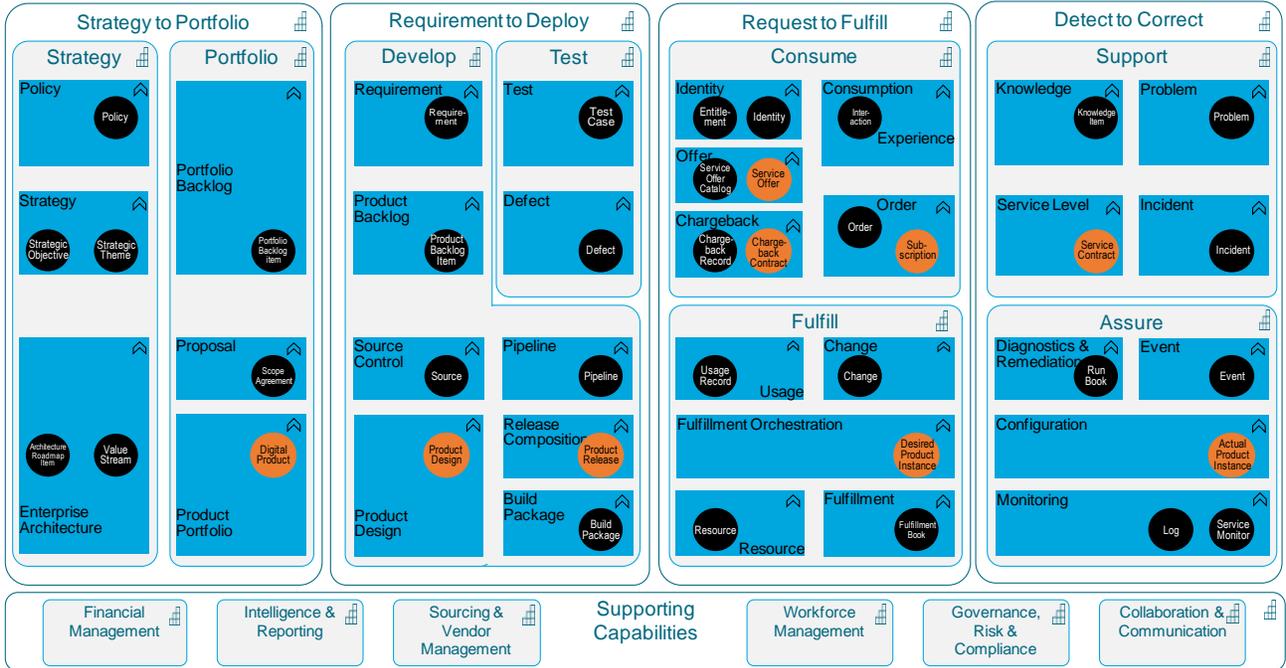nvestment opportunity. As demand for innovative, new, and improved Digital Products is received, discussion with the business should be centered on value delivery to the consumers. The goal of the S2P capability is to create a portfolio framework that allows organizations to optimize Digital Products and services provided to the business by bringing together functional areas of the business. It provides holistic views of Product Portfolio activities. These views provide a better understanding of the inter-relationships between Portfolio Management, Enterprise Architecture, Application Management, Operations Management, and Information Security Management.

The S2P capability has the following functional components:

- Policy
- Strategy
- Enterprise Architecture
- Portfolio Backlog
- Proposal
- Product Portfolio

The Strategy functional component has been added to the IT4IT Reference Architecture, Version 3.0. It manages the strategic themes and objectives driving behavior in the Digital Value Network. Portfolio Backlog Items managed in the Portfolio Backlog are related to strategic themes to ensure alignment with the strategic direction.

Organizations today need accurate and point-in-time information to understand the inter-relationships and inter-dependencies required to truly orchestrate all the moving parts of Digital Products to realize business objectives and goals. Many organizations have portfolio processes and solutions in place, but suffer from the following limitations:

- Poor data quality and consistency

- No holistic portfolio view across the enterprise

- Inconsistent portfolio, service, and product management

- Poor tracking and traceability of information across the product lifecycle

The S2P capability provides a blueprint for optimizing products, services, and investment portfolio management. The end-to-end portfolio view provided by the S2P capability raises the visibility of key data objects often overlooked during portfolio planning activities. The S2P capability enables organizations with a framework for interconnecting data objects between the functions of Portfolio Management, including: Policy, Strategy, Enterprise Architecture, Portfolio Backlog, Proposal, and Product Portfolio. These functional components need to have consistent data and traceability to optimize the organization's Portfolio Management function. The key value propositions for adopting use of the S2P capability are:

- Holistic portfolio view across the Strategy, Enterprise Architecture, Portfolio Backlog, Proposal, and Product Portfolio functional components

- Portfolio decisions based on business priorities

- Product/service lifecycle tracking through conceptual, logical, and physical domains

- Prioritized investment based on all portfolio facets including cost/value analysis, impacts on architecture, product/service roadmap, and business priorities

- Re-balance of investments between strategic and operational demand

- Solid communication with business stakeholders through roadmaps

5.2 Requirement to Deploy

The Requirement to Deploy (R2D) capability is the "build" part of the Digital Value Network. This capability prioritizes every requirement to build and deploy the best service. It builds what the business needs when it needs it. The R2D capability receives the Digital Product data objects and uses them as a foundation to design and build the Product Release, which is described in a release blueprint that describes how the product is instantiated and delivered. The R2D capability sources (builds, buys, or rents), tests, and delivers the deployable service to the R2F capability.

The R2D capability covers the following functional components:

- Requirement

- Product Backlog

- Source Control

- Product Design

- Pipeline

- Release Composition

- Build Package

- Test

- Defect

The IT4IT Reference Architecture, Version 3.0 introduces the Product Backlog and Pipeline functional components. The Product Backlog manages all work items related to a Digital Product, such as product epics, features, and stories. The Product Backlog is integrated with the Requirement functional component to manage the requirements related to Product Backlog Items including the non-functional requirements related to, for example, security, risk, and service levels.

The Project functional component is removed from the Reference Architecture. Managing the planning of activities is now captured within the Product Backlog functional component.

The Pipeline functional component is orchestrating the build, integration, and deployment activities across the different environments. The Pipeline triggers the build, deployment, and test activities to ensure a Product Release is built, integrated, and works as expected, including non-functional requirements such as those related to performance, user experience, and security.

5.3   Request to Fulfill

The Request to Fulfill (R2F) capability is the "deliver" part of the Digital Value Network. This capability handles requests for services through a streamlined process. It catalogs, fulfills, and manages service usage. The R2F capability receives the Product Release and creates Service Offers which represent how the service is technically delivered. The Service Offers are viewable to the consumer and can be ordered for a set price and Service Contract as detailed in the Service Offer. Once ordered, the R2F capability is responsible for the tasks to transition the service into production, where the D2C capability enables the operational activities of the service.

The R2F capability covers the following functional components:

- Identity

- Chargeback

- Offer

- Consumption Experience

- Order

- Usage

- Change

- Fulfillment Orchestration

- Resource

- Fulfillment

The Catalog Composition functional component is removed. The catalog entries are managed as part of the Offer functional component.

The Identity functional component is added to the R2F capability. This component is responsible for managing the lifecycle of identities (e.g., user identities and system identities).

A Resource functional component has been introduced to manage the configuration and capacity of the various resources (such as performing capacity allocation and assigning and configuring technology resources). Each technology platform typically has its own Resource component to manage and allocate resources (e.g., cloud resource allocation).

5.4 Detect to Correct

The Detect to Correct (D2C) capability is the "run" part of the Digital Value Network. This capability seeks to detect issues and correct them before impacting users. It anticipates and resolves production issues. The D2C capability provides a framework to integrate the monitoring, management, remediation, and other operational aspects associated with realized services. It also provides a comprehensive overview of the business of digital technology operations and the services those teams deliver. Output from the D2C capability is used to assess and evaluate the Digital Product Portfolio, which can enter the lifecycle as new demands within the S2P capability.

The D2C capability covers the following functional components:

- Knowledge

- Problem

- Service Level

- Incident

- Diagnostics & Remediation

- Event

- Configuration

- Monitoring

5.5 Supporting Capabilities

In addition to the primary capabilities, the following supporting capabilities are defined in the IT4IT Reference Architecture:

- Financial Management

- Intelligence & Reporting

- Sourcing & Vendor Management

- Workforce Management

- Governance, Risk & Compliance

- Collaboration & Communication

The supporting capabilities support and enable the primary capabilities and value streams as part of the Digital Value Network. These capabilities are typically integrated into enterprise functions such as those related to Finance, Enterprise Risk, Procurement, and HR.

Financial Management covers all financial management capabilities related to Digital Products, such as related to allocating and managing budgets, defining product cost models, allocating costs based upon consumption data, receiving and validating vendor invoices, etc.

Intelligence & Reporting covers all the capabilities to enable and support data analysis, reporting, and decision-making. This includes defining key metrics/KPIs and providing self-service management reporting, data analytics, and data science capabilities.

Sourcing & Vendor Management manages the onboarding and off-boarding of vendors and service providers. It manages the vendor relationship, vendor contracts, vendor performance, and sourcing and procurement activities.

Workforce Management covers the management of HR from hire to retire, including resource planning, coordinating joiner, move, and leaver activities, plan and execute training, managing employee satisfaction, supporting career planning, etc.

Governance, Risk & Compliance covers the management of risks, performing risk assessment, plan and execute audits, managing audit findings, managing compliance, and so on. This supporting capability is tightly linked to the Policy functional component to manage the control framework. Risk assessments are performed against the Digital Product Portfolio, such as business impact assessment, threat and vulnerability assessment, and data privacy assessments.

Collaboration & Communication covers the capabilities to enable effective and efficient collaboration between stakeholders, such as providing online collaboration, chat, messaging, and notifications components.

A   Overview of Version 3.0 Changes

This appendix provides a summary of the most significant changes and enhancements as part of the planned IT4IT Reference Architecture, Version 3.0.

From IT Value Chain to Digital Value Network

The IT4IT Reference Architecture introduced IT value streams as an essential construct for managing the business of IT. In Version 3.0, these value streams are further enhanced. In the move to Digital Product Management, the concept of the IT value chain is transitioned into the Digital Value Network, which represents the iterative and collaborative nature of parties interacting within the value streams and their interconnections with consumers and vendors in the ecosystem. The Digital Value Network demonstrates how value is created in this new digital ecosystem, by a multitude of collaborations and connections between the different parties such as the consumers, vendors, business partners, and government institutions. A value network allows for integration and seamless data flows between the different entities involved in co-creating value within their network.

Digital Product Backbone

Service-centricity and the concept of the Service Model Backbone have been significantly improved in two ways. First is the shift to product-centricity where the service aspect is covered as a way of delivering products as a service. The Service Model Backbone has evolved to become the Digital Product Backbone. Secondly, the backbone has been simplified to define a single primary data object at each stage.

New Value Streams

The original IT value chain with four value streams – commonly referred to as S2P, R2D, R2F, and D2C – has been converted into capabilities, and seven new value streams have been introduced. The new value streams integrate several capabilities and functional components to optimize the end-to-end journeys.

Strategy to Portfolio

The Strategy functional component has been introduced and significant updates made to the way strategy, architecture, and Digital Products work together.

The Service Portfolio functional component has been renamed to Product Portfolio.

Requirement to Deploy

This part of the Reference Architecture has been upgraded significantly to reflect how many Agile development, CD, and DevOps models work. This includes renaming some data objects and functional components to reflect the common naming in Agile and DevOps communities.

Request to Fulfill

Change Management is moved from D2C to R2F to reflect that change is an activity that is managed by the R2F capability. Further, the R2F capability has seen the introduction of Identity Management as well as better formalization of the Service Catalog, Engagement Experience Portal, and Offer Consumption functional components.

Table 2 provides a high-level overview of the functional components and data objects in Version 3.0, as compared to the IT4IT Reference Architecture, Version 2.1.

Table 2: High-Level Overview of Version 3.0 Functional Components and Data Objects

IT4IT Capability (Version 3.0)	Functional Component (Version 3.0)	Data Object (Version 3.0)	Functional Component (Version 2.1)	Data Object (Version 2.1)
Strategy to Portfolio	Policy	Policy	Policy	Policy
Strategy to Portfolio	Strategy	Strategic Theme Strategic Objective	—	—
Strategy to Portfolio	Enterprise Architecture	Architecture Roadmap Item Value Stream	Enterprise Architecture	Enterprise Architecture
Strategy to Portfolio	Portfolio Backlog	Portfolio Backlog Item	Portfolio Demand	Portfolio Backlog Item
Strategy to Portfolio	Proposal	Scope Agreement	Proposal	Scope Agreement
Strategy to Portfolio	Budget	Budget Item	IT Investment Portfolio	IT Budget Item
Strategy to Portfolio	Product Portfolio	Digital Product	Service Portfolio	Conceptual Service
Requirement to Deploy	Requirement	Requirement	Requirement	Requirement
Requirement to Deploy	Product Backlog	Product Backlog Item	—	—
Requirement to Deploy	Source Control	Source	Source Control	Source
Requirement to Deploy	Product Design	Product Design	Service Design	Logical Service
Requirement to Deploy	Pipeline	Pipeline	—	—

IT4IT Capability (Version 3.0)	Functional Component (Version 3.0)	Data Object (Version 3.0)	Functional Component (Version 2.1)	Data Object (Version 2.1)
Requirement to Deploy	Release Composition	Product Release Release Package	Release Composition	Service Release Service Release Blueprint
Requirement to Deploy	Build Package	Build Package	Build Package	Build Package
Requirement to Deploy	—	—	Build	Build
Requirement to Deploy	—	—	Project	IT Initiative
Requirement to Deploy	Test	Test Case	Test	Test Case
Requirement to Deploy	Defect	Defect	Defect	Defect
Request to Fulfill	Identity	Entitlement Identity	—	—
Request to Fulfill	Chargeback	Chargeback Record Chargeback Contract	Chargeback/Showback	Chargeback Contract Chargeback Record
Request to Fulfill	Offer	Service Offer Service Offer Catalog	Offer Management	Offer
Request to Fulfill	Consumption Experience	Interaction	Offer Consumption	Shopping Cart
Request to Fulfill	Order	Order Subscription	Request Rationalization	Request Subscription
Request to Fulfill	—	—	Catalog Composition	Service Catalog Entry
Request to Fulfill	Usage	Usage Record	Usage	Usage Record
Request to Fulfill	Change	Change	Change Control	RFC
Request to Fulfill	Fulfillment Orchestration	Desired Product Instance	Fulfillment Execution	Fulfillment Request Desired Service
Request to Fulfill	Resource	Resource	—	—
Request to Fulfill	Fulfillment	Fulfillment Book	Fulfillment Execution Engine	—

IT4IT Capability (Version 3.0)	Functional Component (Version 3.0)	Data Object (Version 3.0)	Functional Component (Version 2.1)	Data Object (Version 2.1)
Detect to Correct	Knowledge	Knowledge Item	Knowledge & Collaboration	Knowledge Conversation
Detect to Correct	Problem	Problem	Problem	Problem, Known Error
Detect to Correct	Service Level	Service Contract	Service Level	Service Contract Key Performance Indicator
Detect to Correct	Incident	Incident	Incident	Incident
Detect to Correct	Diagnostics & Remediation	Run Book	Diagnostics & Remediation	Run Book
Detect to Correct	Event	Event	Event	Event
Detect to Correct	Configuration	Actual Product Instance	Configuration Management	Actual Service
Detect to Correct	Monitoring	Service Monitor Log	Service Monitoring	Service Monitor

Abbreviations and Acronyms

AI   Artificial Intelligence

API   Application Program Interface

CD   Continuous Delivery

CI   Continuous Integration

ITSM   IT Service Management

KPI   Key Performance Indicator

ML   Machine Learning

SaaS   Software as a Service

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