Shell and The Open Group IT4IT™ Reference Architecture, Version 2.0

The Adoption of the IT4IT Standard at Shell

An Open Group Case Study

January 2016

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Document No.: Y160

Published by The Open Group, January 2016.

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Introduction

Royal Dutch Shell (Shell) is one of the world's largest oil and gas companies having over 94,000 employees in more than 70 countries. The business covers the full spectrum of activities from exploration to retail for oil products and chemicals. The Shell Upstream business explores for and extracts crude oil and natural gas, while the Downstream business refines, supplies, trades, and ships crude worldwide, manufactures and markets a range of products, and produces petrochemicals for industrial customers.

The aspiration of Shell is to be the world's most competitive and innovative energy company. Innovation and technology is a core differentiator for Shell. The IT function needs to support this vision and strategy by providing an optimized portfolio of IT services to support the shifting business demands in a constantly changing business environment. Shell has a large IT function which requires sophisticated and integrated IT management capabilities to ensure IT delivers against expectations while constraining costs and ensuring secure and reliable operations.

Background

Using innovation and technology enables Shell to find more oil, extend the life of production platforms, and enhance profitability by extracting and refining more efficiently. Technology and innovation are also essential to Shell to meet the world's energy demands in a competitive way while building a sustainable energy future. In addition, Shell operates in environments where the most advanced technologies are needed. For example, Shell operates and monitors its oil and gas fields efficiently with SmartFields™ technology that uses sophisticated sensors for heat and pressure linked to real-time monitoring centers around the world. This allows operators to respond quickly to potential difficulties, optimizing output. Another example is a seismic sensing system using fiber optics to help pinpoint resources more effectively underground. This strong technology bias makes Shell a very intense user of IT.

Some key facts and figures of the Shell IT landscape:

Number of Applications	Over 5,000 business applications
Number of Desktops	140,000+ desktops and laptops in1,800 sites
Number of Servers	25,000 servers
Number of IT Staff	10,000 (including contractors)

There is an increased attention at board level to optimize the value of IT while at the same time reducing IT costs. The former CIO of Shell stated at the launch of The Open Group IT4IT™ Forum in 2014:

"Like many other companies, Shell faces challenges around matching IT capabilities to core business needs, and reducing IT spend while delivering IT solutions faster. Rapid technological developments like cloud computing, IT consumerization, and big data add further complexity, and we find ourselves in a position where we are increasingly stretched to respond to rising demand and a need for greater agility."

At Shell a number of disruptive IT technologies or ecosystem changes are identified for the near future which require new and integrated IT management capabilities, such as:

- Increasing use of cloud solutions; e.g., Software as a Service (SaaS)
- Escalating number of devices connected to the network
- Accelerating number of interfaces between applications and external parties
- Increasing volume of changes and releases (due to continuous delivery)
- Increasing security risks; and the need to act more quickly
- Increasing number of external service providers (a more complex IT ecosystem)
- Growing consumption and usage of IT resources (e.g., more transactions, more storage, etc.)

This creates a new IT ecosystem in which the Shell IT organization must become more responsive, agile, and cost-effective. As highlighted by Mary Jarrett (IT4IT Manager at Shell) in her presentation at The Open Group launch of the IT4IT Reference Architecture in October 2015:

"IT needs to become quicker, easier to use, perform well every day, and do that at lower cost and risk."

These trends raise the demand for more consolidated and automated IT4IT capabilities. Shell realizes that it must adopt open market standards to provide these integrated capabilities to manage the IT function.

Adoption of the IT4IT Reference Architecture

Because of the lack of applicable standards in the market, Shell has for the last decade developed its own IT management architecture and blueprint to improve and standardize the IT function. This blueprint consisted of a common process model, IT data model, and IT management tool architecture. Best practices such as ITIL, COBIT, SCRUM, and PMBOK were combined to provide a standard delivery model of how to operate IT. However, the implementation of the tools needed to support this IT operating model required a lot of customization and maintenance effort.

During a large outsourcing initiative in 2008, the majority of the IT infrastructure was outsourced to three global external service providers. Shell had to develop its own interfaces to collaborate and integrate with these providers in order to exchange incidents, changes, consumption, and IT costs data – this all due to the lack of open and standard integrations to collaborate with external service providers. There is still a lot of effort involved in the design, configuration, integration, and maintenance of IT management tools. Multiple tools from different vendors are needed to manage the IT estate through its end-to-end lifecycle. Often tools from different vendors (or even from the same vendor) do not integrate well and each vendor has its own proprietary data models, which makes it difficult to share information to improve transparency and support decision-making. Although there are many IT standards and frameworks such as ITIL and COBIT, a major gap remains: each vendor has chosen its own way for how these IT processes are actually performed.

Now the next outsourcing wave is coming in which IT services are moving to the public cloud. As a result, the number of service providers in the IT ecosystem will significantly increase, requiring a different approach for service brokering, integration, and orchestration. With this cloud enablement, a similar challenge as in 2008 is becoming apparent. In this new IT ecosystem automation and integration are becoming even more

important, such as automated testing, automated deployment, and provisioning. That is why The Open Group IT4IT Reference Architecture is becoming essential. Instead of continually inventing the wheel itself, Shell engaged with a number of vendors and other organizations to jointly design and develop a standard IT management blueprint. This arrangement paved the way for Shell and several other companies to share their expertise in The Open Group IT4IT Forum.

Shell stands to benefit from this work in various ways – for example, by enabling the vitally needed interoperability in multi-vendor ecosystems and gaining a much deeper insight into what is happening in the IT function – that will highlight opportunities for cost improvement, quality enhancement, and risk reduction.

The IT4IT Reference Architecture is not just a set of documents. As Mary Jarrett stated:

"It is a philosophy which Shell believes in."

This includes, for example:

- Transformation from internal data centers to broker of IT services
- A common data model throughout the lifecycle
- Integrated management capabilities enabling DevOps
- Flexibility for new management models for emerging technologies
- Exchange of information in a growing ecosystem of vendors

Shell believes IT can be delivered faster, better, cheaper, and at lower risk through this holistic IT4IT approach. The IT4IT standard needs to be supported in the IT industry both by IT consumers (such as Shell) and well as service providers and IT management tool vendors.

"We have been working for quite a while, trying to rationalize and build out a portfolio of IT management solutions in Shell – using ITIL and COBIT as process guidance in that space. But it has proven to be quite a difficult journey and we believe that we can only really get value from our investments, and get to the deep and detailed insights we need in order to manage IT properly, if we have a holistic and integrated set of solutions in IT. This is becoming all the more relevant as we are growing our ecosystem with more partners, and we need to be able to exchange information. We believe the only way we can actually achieve that, is by building out an open standard – and that is exactly what The Open Group delivers. I believe that this is going to make the difference in the IT industry, making it mature and much more professional and we all stand to benefit from that." (Karel van Zeeland, Lead IT4IT Architect at Shell)

An IT4IT Governance Model

An essential component of an IT capability is to define and implement a governance model of how the IT function should be designed, operated, and supported. This section provides a brief overview of how the IT management capabilities are governed and managed within Shell. The vision of Shell is that IT management capabilities should be put under a single governance model with an IT executive owner. This helps to safeguard IT management capability improvements and investments.

Key entities involved in the IT4IT governance model at Shell are:

- Sponsorship at the IT executive leadership team (the CIO and IT executives)

- A center of excellence responsible for defining how the IT function should work (defining best practices and "one way of working") – this is internally within Shell referred to as the "Functional Excellence" team
- The IT4IT architecture team (with the lead IT4IT architect)
- The IT4IT delivery organization (headed by an IT4IT manager) responsible for the delivery and management of all IT management solutions within the IT4IT portfolio

The IT executive leadership team is the single governance and key decision-making body for the entire IT function. This team is collectively accountable for the overall strategic direction, performance, annual IT expenditure, and leadership of the IT function. This team is headed by the Group CIO of Shell.

Shell is convinced that IT management tools need to be managed as one integrated portfolio similar to other business IT portfolios. This enables Shell to optimize and rationalize the IT management applications used to support IT processes. Therefore, the accountability to develop and manage IT management solutions is assigned to one organization also called "IT4IT". This is similar to other global IT solutions such as within the HR, procurement, facility, and financial domains. The IT4IT delivery organization manages the standardized set of solutions to support the IT function such as application and project portfolio, Enterprise Architecture system, test management tools, IT Service Management (ITSM) system, Configuration Management Database (CMDB), and monitoring tools. These IT management solutions are delivered as a service (IT4IT as a service) to all the different IT departments and user communities.

The IT4IT architect is part of the overall IT architecture community within the IT organization. The IT4IT architect governs the overall architecture of all IT management solutions as part of the IT4IT capability. The IT4IT architect uses the IT4IT Reference Architecture as the blueprint. This architect provides the end-to-end view of how processes, tools, and data should be designed and integrated. This person also engages with IT tool vendors and monitors market developments related to IT management.

Another team has been formed (a kind of center of excellence) which is responsible for working with practitioners across IT to facilitate best practices, standardize processes, and continuously improve them. This team is responsible for defining how the IT function is organized and supported by standard practices, processes, and common data models. The center of excellence is organized around a group of capabilities (and IT processes) similar to the IT4IT value streams. For each of these value streams there are sponsors defined at executive level to ensure there is sufficient support at the level of the CIO. The activities of the center of excellence are governed by the IT executive leadership team that reviews and approves proposed plans and investments and monitors progress.

Shell has been working for a considerable time to standardize and rationalize the portfolio of applications that are used to manage the IT function. With this IT4IT governance model, Shell has a unique proposition in having a dedicated IT4IT organization managing the portfolio, architecture, development, and operations of the IT management solutions. The IT4IT organization provides the standard toolkit to support capabilities such as application portfolio management, Project Portfolio Management (PPM) tool, Enterprise Architecture, test management, CMDB, IT financial management, and so on. Not many multi-nationals have this enterprise scale, standardized common processes and standard IT management tooling landscape that is available within Shell. For example, there is one single enterprise-wide ITSM system for managing incidents, problems, and changes; a standard request management portal for service requests from a service catalog; one global project management system, one federated CMDB, one Information Rights Management (IRM)

system, and so on. Shell IT4IT has implemented a number of truly global enterprise solutions – including standard processes and guidelines – that are delivered as a service to all internal IT departments. The following table provides a number of examples of these global enterprise IT4IT solutions.

Value Stream	IT Management Solution	Description
Strategy to Portfolio	Integrated service/application and Project Portfolio Management (PPM) Enterprise Architecture (EA) system	Manage portfolio of IT services and related projects (and investments in them) Manage Enterprise Architecture
Requirement to Deploy	Standard development and test management platform (referred to as SEDE) including source code management	Include build and test automation
Request to Fulfill	Standard self-service portal (my request)	Self-service request portal; for example, to request a new laptop, access to business applications, or new infrastructure resources such as servers or databases
Detect to Correct	ITSM system Integrated monitoring and event management system (business service management) Integrated security event management system	Standard monitoring systems, ticketing system for managing all incidents, problems and changes integrated with the external service providers
Supporting Activities	IRM system Federated CMDB (with discovery) Software Asset Management (SAM) system IT Business Management (ITBM) for financial transparency	Standard information risk management system to manage risks, compliance, and findings Integrated CMDB Standard IT financial reporting per IT service or application (based upon actual consumption)

Integration between IT management tools becomes more and more important to enable the sharing of data. This requires a standard IT information model to enable data exchange and consolidation. An example in this area is the IT financial management reporting solution within Shell referred to as IT Business Management (ITBM). This solution collects data from many different IT administrations to understand the cost of an application or IT service. This requires a consistent data model to link projects to applications, configuration items to applications, contracts and licenses to applications, infrastructure costs to configuration items, and so on. An important foundation of the IT4IT solution is the central repository covering all IT services and applications. All activities within the IT organization are linked to this service portfolio such as linking projects to the application, linking costs, contracts and infrastructure components, or incidents and changes.

Learnings and Conclusion

This section highlights the key learnings from the IT4IT approach adopted at Shell:

- Set up a governance model to manage the IT management capabilities from a process, data, and tooling perspective (IT4IT delivery unit, IT4IT architect).
- Ensure IT executive sponsorship for IT management (at the level of the CIO).
- Provide architectural guidance for IT management capabilities by assigning an enterprise-wide IT4IT architect.
- Manage all IT management solutions as a single and integrated portfolio, defining clear ownership and accountability.
- Set up a central IT4IT organization to design, build, deploy, and operate IT management tools, providing IT management tools as a service (IT4IT as a service).
- Build a standardized and rationalized IT4IT tooling portfolio aligned with the IT management practices and changing IT management demands, and build strategic relationships with a limited number of IT management vendors.
- Build a community within the IT function to define standard practices and engage with IT specialists to continually capture feedback to improve the IT management capabilities.
- Ensure tool selections are governed by the IT4IT delivery organization, IT4IT architecture, and IT functional excellence team.
- Use The Open Group IT4IT Reference Architecture as a blueprint to analyze the current state; assess opportunities for improvement and agree on the target state.
- Define an IT4IT roadmap guiding future investments and supporting improvement opportunities.
- The roadmap of implementing IT4IT depends upon the maturity of the current IT management capabilities. Therefore, it is essential to analyze the current state and determine the most important next steps.

About The Open Group

The Open Group is a global consortium that enables the achievement of business objectives through IT standards. With more than 500 member organizations, The Open Group has a diverse membership that spans all sectors of the IT community – customers, systems and solutions suppliers, tool vendors, integrators, and consultants, as well as academics and researchers – to:

- Capture, understand, and address current and emerging requirements, and establish policies and share best practices
- Facilitate interoperability, develop consensus, and evolve and integrate specifications and open source technologies
- Offer a comprehensive set of services to enhance the operational efficiency of consortia
- Operate the industry's premier certification service

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