Enabling the Enterprise Cloud Journey
With Hybrid IT Application Automation

Increasing business agility and innovation while maintaining control of governance and compliance can be a difficult balance to achieve. Hybrid IT application automation can provide the answer.

Cloud computing is now the "new normal" for enterprise IT environments. Businesses now plan "cloud first" and are increasingly taking an application-centric approach to cloud, using a mix of cloud vendors to best meet their application needs. A recent survey of IT decision makers commissioned by Fujitsu revealed that 57% of respondents deal with between one and three Infrastructure-as-a-Service (IaaS) vendors, while almost 20% deal with between four and ten[1]. To say nothing of Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) vendors layered on top. This helps increase agility and innovation whilst mitigating supplier lock-in, but it also increases complexity and makes it more difficult to maintain governance and control. In fact, Fujitsu's survey revealed that 56% of enterprises find it difficult to achieve the right balance of agility and control.

The Enterprise Cloud Journey

There is no single end point for application deployment in the cloud. The proverbial journey is as important as the destination, allowing enterprises to define the best location for applications depending on business goals and existing IT infrastructure. And then, of course, redefine that location as required in the future. The same Fujitsu survey showed that almost 80% of respondents want to be able to move workloads more easily between clouds.

There are three main phases in this journey to cloud, and most enterprises will implement a combination of them depending on the needs of individual workloads:

- Cloud-hosted applications: IT departments essentially just re-host applications in a new environment, making no changes to the application itself. Relatively simple to implement, this "lift and shift" approach is usually cheaper and less disruptive in the short term. However, it offers little in longer term cost savings, increased agility, and greater transparency and governance. Re-hosting can be a good starting point in your journey to cloud, but is unlikely to be a good end point.

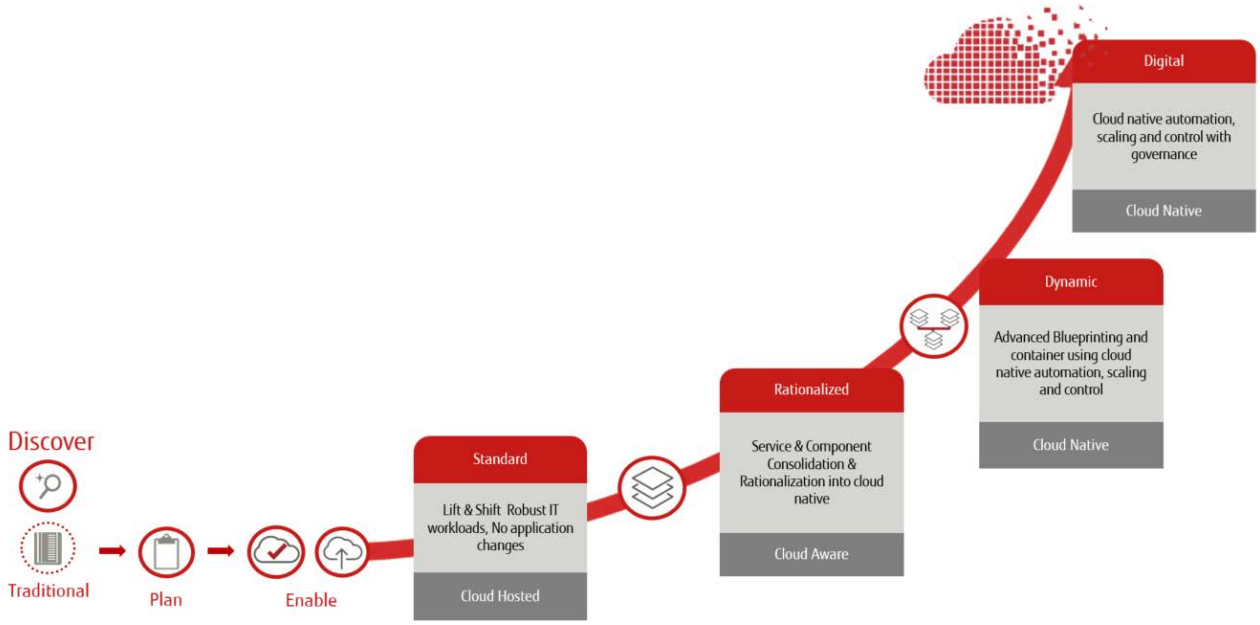
- Cloud-aware applications: replatforming or even refactoring applications should provide increased performance, governance, manageability and other benefits in the cloud. These are also excellent ways to rationalize and standardize applications as you move to cloud. However, certain applications cannot easily be replatformed without a complete code re-write.

- Cloud-native applications: often seen as the "holy grail" of the cloud journey, building cloud-native applications using agile methodologies and DevOps processes offers the biggest potential upside in the long term. You can build, test, release and maintain applications more quickly, accelerating release processes and harnessing collaboration to increase enterprise agility and innovation. Of course, this approach can also be the most complex, disruptive and expensive in the short term, requiring the biggest cultural shift within your business.

Many businesses will continue to run certain applications in a legacy data centre for the foreseeable future, due to architecture, compliance, licensing or other reasons. This makes it essential to master Hybrid IT—a two-speed approach which aims to provide a "best of both worlds" scenario by running applications in the cloud alongside those in traditional data centres.

[1] The State of Orchestration: 2017, a Market Report, www.stateoforchestration.com

Enterprise Cloud Journey: From Legacy to Cloud-Native Applications



Hybrid IT sets the scene for digital transformation by increasing IT agility and innovation to meet your business and customer needs, while letting you manage and control the governance, risk, compliance and security required for certain workloads.

This paper will help you understand how UForge AppCenter can help you on your journey to cloud, letting you balance agility and control by ensuring that enterprise application delivery and management is automated, standardized, re-usable and repeatable across platforms.

The Challenges of Enterprise Application Delivery for Hybrid IT

Unfortunately, application delivery processes today are often ill-equipped to deal with the complexity of Hybrid IT environments, which may combine multiple IaaS and PaaS cloud platforms alongside legacy virtualized data centres. In fact, over half of respondents surveyed by Fujitsu find their cloud estate too complex to manage. In such an environment, there are numerous challenges to even "lift and shift" software, let alone a wholesale move to cloud-native applications. These challenges include:

- Manual, slow and error-prone processes: few enterprises today have fully automated their application release processes. DevOps toolchains often grow organically, rather than strategically. Not all the tools may work together. And some tools may be used for tasks they were not originally designed to handle, for example continuous integration (CI) or configuration management (CM) tools may be used for release orchestration. This ends up in extensive use of scripting and manual integration work, which may be the fastest approach in a simple IT environment, but simply cannot scale to the complexity of a hybrid environment. Nor does it reduce the risk of human error.

- Governance is compromised: in response to changing customer requirements and market conditions, business units have jumped on the cloud bandwagon to increase agility, without the agreement or knowledge of the IT department. This leads to "shadow IT" running alongside corporate-approved IT, and can cause significant challenges in governance and compliance.

- Concern about vendor lock-in: the difficulty of moving applications between clouds, means businesses worry about becoming locked into a specific cloud vendor, unable to transfer workloads if needed. Uncertainty about how this may affect them in the future can be a limiting factor as enterprises plan their cloud journey.

- Lack of standardization and repeatability: Development and operations expertise in a specific application is often limited to "what's in Brent's head". There are few–if any–common processes or centralized repositories of software and software expertise. This is fine, until Brent leaves the company and his knowledge is lost. Enterprises need to standardize applications, centralize repositories and model Brent's expertise "as code" to avoid long-term risk.

- Employees lack expertise: finding the expertise needed to master the multiple clouds that make up Hybrid IT environments, can be a real challenge. Fujitsu found that 55% of enterprises lack the in-house skills required to effectively manage their cloud estate. DevOps staff often spend significant cycles learning different cloud tools and infrastructures, instead of what they should be doing: designing and releasing new features and applications.

- Little insight into existing applications: Existing datacentre servers are often opaque "black boxes" providing no visibility in the software components that make up the server. Not only can this cause governance problems, it also makes it difficult to bring existing applications into a new cloud strategy beyond a simple "lift and shift".

Given some of these challenges, it is little wonder that many businesses struggle on their cloud journey. Simply re-hosting applications in the cloud doesn't solve these issues; it merely shifts them to a new environment. And bringing existing IT processes and applications into newer, more agile DevOps processes can seem like a pipe dream.

How Can Enterprises Meet These Challenges?

Businesses must address such challenges to achieve the agility, cost and control benefits they are looking for from cloud computing and Hybrid IT. Essential technology building blocks to improve application delivery and management include:

- Platform neutrality and codified deployments for no lock-in: essentially, this means de-coupling the application from underlying infrastructure to ensure it does not get locked into a specific environment. Modelling application deployments "as code" lets them run in a consistent, repeatable way on any platform. This requires tools which are natively hybrid. Modelling also builds software knowledge and intellectual property into a re-usable format–independent of Brent who actually wrote the code–and avoids having to employ or train an army of experts in different cloud infrastructures and tools.

- End-to-end automation and autonomics: partially automated processes already confer benefits in efficiency and reliability. However, the ultimate goal should be to automate application release processes end-to-end, from build to ongoing self-monitoring and management in the cloud. A holistic approach to application delivery and management is required, looking at the entire tool chain to identify manual processes and bottlenecks and integrating new tools as needed to increase automation and autonomy.

- Self-service, enterprise-ready tools to enable innovation: Repurposing existing tools, or using tools which lack critical enterprise functionality such as reliability, scalability, authentication and security, tends to cause long-term pain and relies on manual integration work to "plug the gaps". Fully-supported, enterprise-ready tools which can be easily integrated into your existing environment and which provide developers with self-service "build and deploy" help curb shadow IT and free up staff time to focus on innovating new features and applications that meet your customer needs.

- Visibility and transparency for governance and compliance: To meet governance, security, audit and compliance requirements, enterprises need to retire "black boxes" for good. You need visibility into every aspect of your application, all the way down to individual operating system packages and files, as well as the ability to document, log and enforce application delivery through centralized repositories and common processes.

How UForge AppCenter Helps You on Your Cloud Journey

FUJITSU Software UForge AppCenter is an automated application delivery and management platform for Hybrid IT environments, designed to support multiple IaaS, PaaS, container and virtual platforms so you can deploy applications wherever you need them.

Platform Agnostic Modelling

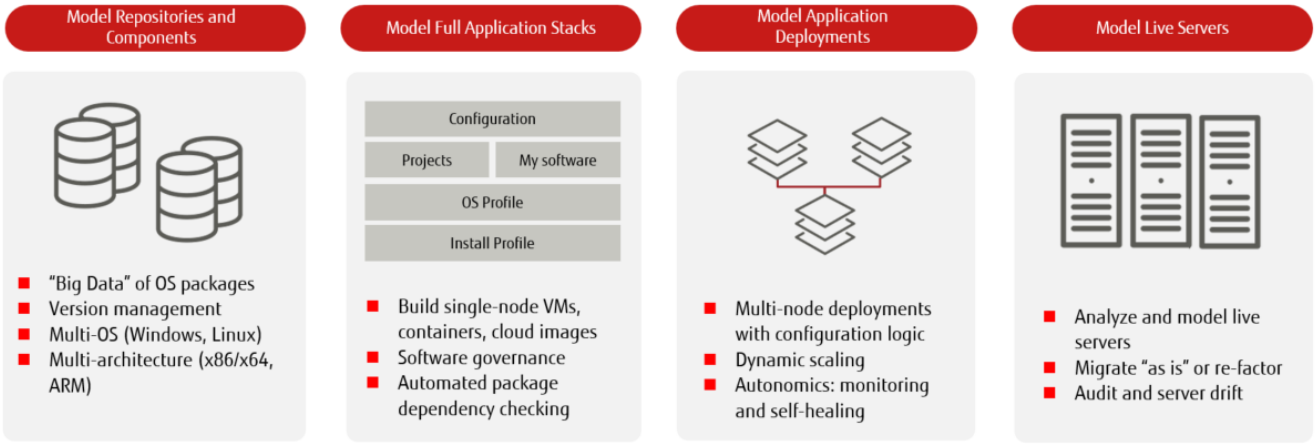
UForge takes a "model once, run anywhere" approach. It fully codifies deployments in a platform-agnostic format–from individual OS packages up to complex, multi-node applications, providing governance, transparency and control across the board and ensuring you don't get locked into a specific cloud infrastructure or vendor. Specifically, UForge enables you to:

- Model existing servers for cloud-hosted and cloud-aware applications: UForge analyses live servers then builds a full-stack meta-data template–from the install profile and OS packages up to the middleware and applications–from your server. This template exists independently of any specific cloud environment, and lets you update, patch and otherwise modify your application stack for a different deployment environment. While it can be used for an immediate "lift and shift", this is ideal for re-platforming your applications to make them cloud aware.

- Model applications and infrastructure for cloud-native applications: UForge lets you treat applications and infrastructure "as code", making it ideal for building new cloud-native applications to derive maximum agility and cost benefits as part of your digital transformation. With UForge Templating, create single-node, full application stacks–OS to application–as meta-data templates with full visibility into all components and dependencies. UForge can then build individual templates into "infrastructure as code" blueprints of complex, multi-node application deployments. Such blueprints can contain sensors and policies that allow applications to self-heal or change their configuration dynamically.

Both templates and blueprints are cloud-neutral and can be easily and consistently tested and deployed across any cloud, virtual or container environment. You can implement different infrastructures for dev, unit test, QA, pre-prod, and production, without developers and IT staff needing to become experts in several clouds and cloud-specific tools.

Platform-Neutral Modelling and Applications and Infrastructure "as Code"



AIOps for Always-On Applications

UForge builds Artificially Intelligent Operations (AIOps) into your application deployments using the sensors and policies outlined above. This maximizes application availability and uptime, helping keep applications "always-on" with improved service level agreements and zero data loss.

UForge provides a "triple AAA" approach to AIOps, including:

- Automated build and deploy: applications automatically built to standards limiting human error
- Autonomic operations: in-life self-monitoring and self-regulating applications to scale up and down, and start or stop processes as required
- Autonomous healing: changing the configuration dynamically to heal the application

Integration with DevOps Toolchains

100% REST API coverage and an open-source command-line interface (CLI) known as hammr, mean UForge can easily integrate with existing DevOps toolchains to automate steps which are currently performed manually, such as machine image build.

For example, an enterprise might use a CI platform like Jenkins to create nightly builds, resulting in a software artefact such as a war file, tarball or rpm package that has been unit tested. UForge can pick these artefacts up from Jenkins and automatically generate a virtual machine image or container that can be deployed on a target cloud to run more complex integration, security or performance testing. Once the application is ready for release, UForge can push it directly to a dedicated on-premise system or different cloud platform for production. Tools such as Puppet or Chef can then be used for configuration management. Additionally UForge Blueprinting provides for ongoing in-life monitoring, healing and management.

Self-Service Tools with Software Governance

UForge is a self-service platform that lets you combine the control required by IT departments, with the business's demand for agility, thus reducing the need for shadow IT. Administrators can set centralized OS profiles and enterprise-wide software catalogues so developers can easily comply with corporate software policies. Software repositories can be centralized or referenced as needed. Yet developers benefit from self-service tools to build and deploy applications quickly and meet customer needs. A private catalogue lets them govern the individual software components required to build their application.

Integration with Containers

Containers have understandably taken off recently, making it faster and easier to develop and test applications. They are ideal for fast-moving environment as, with a leaner, shared host OS, they are quicker to start up than VMs and offer a smaller runtime and storage. However, containers are subject to the same software governance issues as VM builds. Transparency and traceability are key, particularly at audit time. UForge plays a valuable role in container governance. A natively hybrid platform, it treats containers as any other target environment, building a Docker or LXC image directly from your template ready for deployment. You have complete visibility into all the packages that make up your container, with sophisticated version management to ensure you use the same tested and approved software versions each and every time. Such predictability is invaluable in an enterprise environment where governance and compliance are critical.

Additionally, you can also build containers from your existing VMs in a couple of clicks. And if you're not yet ready to use containers in production, UForge makes it easy to work with them in a dev and test environment, then transition to VMs for production. As your application goes through development, test and QA processes, the template remains your point of reference: it can be used to generate containers for test, then a final virtual machine image for a production environment once your application is ready for release.

UForge will also integrate with Amazon Elastic Container Registry and Azure Container Registry services, letting you register Docker images directly into your cloud account ready for provisioning.

Integration with PaaS Platforms

As with containers, Platform as a service (PaaS) platforms continue to grow in popularity as enterprises look for ways to simplify application development without developers having to worry about the underlying infrastructure. Most PaaS platforms, such as Red Hat OpenShift and Cloud Foundry, now support containers. UForge can easily create Docker or LXC images from your meta-data template. It registers these images into OpenShift or Cloud Foundry, ready for deployment using your PaaS tools. And with the added advantage that, as you have fully modelled your stack as a template, your application can be easily deployed to other platforms if needed.

Collaboration and Sharing

To increase the pace of innovation, businesses are breaking down organizational boundaries to create an environment in which development and operations teams collaborate more easily. Through enterprises workspaces and social networking features, UForge empowers development, QA and release engineering teams to work together and share templates and blueprints throughout development, then hand off to operations. Additionally, it can be used as a shared platform between Fujitsu services staff, and your developers and operations staff, to co-create enterprise reference templates and blueprints which can be used, re-used and updated time and time again.

Benefits of UForge AppCenter for the Enterprise

No matter where you are on your cloud journey–whether you plan to move a few applications over from a legacy data centre or go for broke in your digital transformation with fully cloud-native applications–UForge can bring you many benefits:

- Increased agility: provides business application teams with self-service build and deploy so they can get apps up and running faster and respond more quickly to customer requirements; accelerates application release cycles to reduce time to market.
- Lower costs: streamlines and automates processes, lowering the cost and time spent on manual tasks; avoids the need for skills and experts in a host of different cloud infrastructures and cloud-specific tooling.
- No lock-in: enables you to avoid cloud lock in or out, building and running applications in whichever cloud or data centre suits your business needs.
- Always-on applications: helps increase application availability to end users and elevate service-level agreements from 99.XX% to 99.XXX%
- Regain IT control: lets IT stay in control, curating and governing enterprise software builds and encapsulating enterprise software expertise centrally.
- Increased innovation: frees up developer time to code new apps and features; improves teamwork and productivity during development, and improves collaboration with ops teams.
- Full software governance: provides full control across clouds with visibility into your enterprise applications and components; enables easy compliance with corporate software policies.
- Standardization and predictability: deploy standardized applications consistently and repeatably across platforms; let dev teams can consume "known good solutions", sharing and re-using without reinventing the wheel each time.
- Reduced risk: reduces chance of human error due to fewer manual tasks and integration work, along with intelligent self-management.

About UForge AppCenter

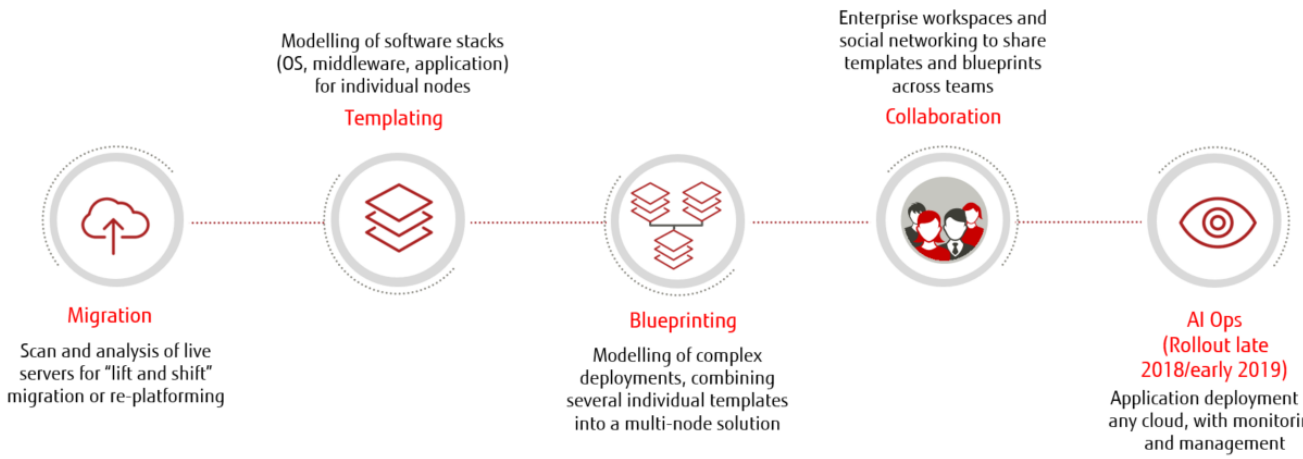
FUJITSU Software UForge AppCenter provides a best-in-class, enterprise-ready platform to model, deploy and manage applications for Hybrid IT environments. UForge AppCenter includes:

- Templating: Cloud-neutral modelling of full software stacks (OS, middleware, application) for individual nodes
- Blueprinting: Cloud-neutral modelling of application deployments, combining several individual templates into a multi-node solution
- Migration: Simple re-hosting of applications in the cloud, or application re-platforming for new environments
- AIOps: In-life autonomics-based monitoring and management of applications (coming late 2018/early 2019)
- Collaboration: Enterprise workspaces and social networking for sharing content between users and teams
- Administration: Management of corporate software catalogues, user management and statistics dashboards

UForge supports Linux and Windows, as well as all leading clouds, hypervisors and containers, including FUJITSU Cloud Service K5, Amazon Web Services, Microsoft Azure, Oracle Cloud, VMware, Google Compute Engine, Docker and many more. Available on premise, on cloud or as a SaaS platform, UForge AppCenter has been designed from the ground up for cloud environments. UForge AppCenter includes 100% API coverage with multiple SDKs (REST, Java, Python) and an open-source CLI available at www.hammr.io

UForge AppCenter is developed and maintained by Fujitsu and UShareSoft, a wholly owned Fujitsu Group company.

UForge AppCenter Key Features



Where to Go Next

Read more at:
- FUJITSU Software UForge AppCenter
- FUJITSU Hybrid IT and Cloud Services

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