Using Cloud Platforms to Achieve Agile but Secure Digital Innovation — The T-Systems Example

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IN THIS PARTNER SPOTLIGHT

T-Systems is a global IT services company with headquarters in Bonn, Germany, and a global network of datacenters and connectivity options for public sector, midmarket, and large enterprise customers. The company is part of the broader Deutsche Telekom Group, and it generated €2.1 billion in revenue in FY3Q15 ended on September 30, 2015.

This paper describes the transition to the digital era and the role that cloud platforms have in enabling digital transformation. In the second section, we present examples of companies achieving specific business objectives by using agile cloud tools and processes. The third section looks at what T-Systems brings to market in this space with AppAgile, and how Red Hat technology makes that possible. Finally, the report provides essential guidance to organizations that are looking to use cloud platforms as a means to accelerate their own digital initiatives.

DIGITAL TRANSFORMATION: SPEED, AGILITY, AND DIFFERENTIATION

Digital transformation or digital experience (DX) continues to be a priority for both IT and business leaders across pretty much every industry. Forward-thinking companies, regardless of size, are exploring how they can leverage disruptive technologies such as cloud, mobile, social, and Big Data analytics — technologies which underpin what IDC terms the 3rd Platform of computing — to find new sources of competitive advantage. Digital transformation is multifaceted, cutting across all business functions — marketing, sales, HR, product, operations, and critically, customer engagement.

Digital transformation is very real and impacts every function, process, and business activity that exists today. IDC defines digital transformation as the adoption of two or more 3rd Platform "pillars" (cloud, Big Data/analytics, social business, and mobility) to drive fundamental business or organizational change. Cloud, in particular, is closely linked to digital transformation.

Cloud services, and particularly cloud platforms including developer and data integration tools, are intrinsically flexible, and so a natural fit to a company looking to embrace a digital strategy. IDC expects that most (if not all) digital initiatives will be built on cloud. Because cloud has become the model of choice for the way that new IT systems are built and deployed, innovative IT projects are using cloud as a foundation, and we expect this will be the case for digital initiatives.

The 3rd Platform is a catalyst for further IT innovation and is core to digital transformation. Technologies built on top of the 3rd Platform, such as IoT (Internet of Things), cognitive computing, robotics, virtual and augmented reality and 3D printing, have the potential to fundamentally disrupt the industries they impact. By the end of 2017, IDC predicts that two-thirds of CEOs of Global 2000 enterprises will have digital transformation at the center of their corporate strategy. The ability to master these 3rd Platform technologies and use them for competitive advantage will be essential for future viability in the digital era.

DIGITAL, CLOUD, AND EUROPEAN ORGANIZATIONS

European organizations are looking to exploit digital transformation in many different ways. Their goals include:

- Transforming internal processes
- Improving profitability
- Entering new markets and better exploiting existing markets
- Improving customer engagement

European organizations see the opportunities that digital transformation can provide, but there is also a good deal of uncertainty over how to go about this. It's transformative by its very nature, so while conceptually it makes sense, it's often difficult to visualize where to apply it as it's all new.

With this in mind, we've identified some real-world examples of the application of digital transformation across different industries. Although each of the examples highlighted below stems from a different industry and was designed around different goals, we believe they all found commonality around the following objectives:

1. Providing actionable insight from a large amount of moving data
2. Experimenting with new and innovative business ideas with low risk/low investment
3. Rapid scaling of a new service to new markets

Objective 1: Providing Actionable Insight from a Large Amount of Moving Data

The IoT is an aggregation of endpoints – or "things" – that are uniquely identifiable and that communicate over a network without human interaction using some form of automated connectivity. These endpoints could be just about anything – sensors, trackers, solar panels, wearables – but with the necessary intelligence built in to track, monitor, record, and communicate data from machine to machine (M2M). These endpoints generate masses of potentially useful data, and leaders from multiple industries are looking to harness that data. The ingestion and analysis of such a volume of data requires a highly scalable platform and cloud platform-as-a-service (PaaS) provides the kind of flexibility, scalability, and, of course, cost efficiency necessary for such large volumes of active data. For example, Deutsche Telekom, a German-headquartered global telecommunications provider, has developed an "M2M Device Cloud," a prepackaged solution designed to provide third-party businesses with connectivity and management of devices in the IoT world. This Device Cloud runs on T-Systems' AppAgile platform.

The management is only a component of the digital solution, however, and what is important to understand is how the application of that data can be used to achieve business objectives:

- A good real-life example of how this technology is being applied comes from the **logistics** and **insurance** industries, where companies are putting solar-panel energized sensors on top of shipping containers to monitor and track the health of the containers in their fleets.

The devices can monitor and provide data on a variety of situations. Was the container opened without authorization? Has the temperature remained constant? Was the container damaged? If so, when and where? Was it at dispatch, in transit, or in the hold? This information is not only important to the shipping company, but also the companies insuring the goods in the container. This data enables them to understand whose responsibility the goods were during that process. This practical application of this information can save insurers a significant amount of money and so they, in turn, are offering reduced premiums to shipping companies that install these management systems, thus providing both efficiency and cost-saving advantages to the companies deploying these technologies.

▪ Vehicle or fleet tracking is another practical example of how these technologies can be used, by providing real-time data on the location of their vehicles at any time, enabling flexible route adjustments, emergency response, and better visibility for reporting back to customers on their order status (in the case of deliveries) or their vehicle (in the case of taxi/limousine or shuttle services). This kind of solution provides business owners with a significant competitive advantage both from an efficiency and customer-service perspective.

Objective 2: Experimenting with innovative Business Ideas, While Minimizing Risk and Investment

One of the key aspects of embracing a digital strategy is that companies are meant to experiment with new, potentially disruptive, business ideas. However, these ideas are often unproven and so building a business case for the financial investment required to develop them can be challenging. Additionally, speed is of the essence and it's rare that a company is agile enough to develop and bring an unproven product to market rapidly using traditional project and development processes. This is where DevOps and platform-as-a-service (PaaS) really comes in to play.

DevOps is a methodology or a set of practices transforming the processes of how software is developed, released, and managed. Customers using DevOps create a team drawn from different business units, typically business leadership, development/testing, and IT operations, to create and deliver business capabilities very rapidly and then iterating quickly to adapt to changing conditions. They utilize self-service tools for the configuration, provisioning, and life-cycle management of development infrastructure and platforms. The same automation templates and workflows can be applied to application release and production system control to ensure consistency between development and production environments. DevOps provides companies with more repeatability and faster time to market than previous development methodologies enabled.

Whereas DevOps is a set of practices, PaaS is a toolset of cloud services for application development and deployment. The key goal of PaaS toolsets is that of allowing companies to develop more quickly, and cost-effectively, by using prebuilt services such as databases, data ingestion, and mobile application links. As a result, disruptive applications can then be brought to market quicker, and tested and piloted, outside of live production environments.

A real-life example how to leverage PaaS and DevOps to trial and pilot innovative applications can be found in the insurance industry:

▪ Trialing new and innovative product ideas is a challenge for many industries. Adorsys, a German-headquartered software company, recognized this and has developed a means for the **insurance** industry to create new products catering to short-term insurance requirements from consumers and seeing what the uptake is without a huge upfront investment. For example, someone who is going on a hiking or skiing holiday might be interested in spontaneously buying additional insurance for just that period. If the application process can be done swiftly via an app, and paid on PayPal, with minimal fuss,

more customers might be interested. Adorsys used PaaS tools and DevOps practices to build back-end IT for this mobile app scenario. The beauty of it lies in the fact that there is very little risk or upfront investment required by the insurance companies offering this product. Because the market for such a product is unproven, insurance companies want to trial it and see if there is an appetite for the product before committing to the investment that a production-grade application would require. If market demand accelerates, they can flexibly scale up, through PaaS, to meet that demand, but don't need to make the hundreds or even millions of euro investment upfront that would be required in a traditional software environment. This is how PaaS and DevOps can lower the risk when experimenting with new business models, and face often unpredictable market realities.

- Another real-life application can be found in **healthcare**, by digitizing some of the services you can typically get from your doctor's practice without actually having to see a doctor. By digitizing these services, the medical practice can focus on what they are supposed to do – providing healthcare services – and minimize the administration involved in areas such as prescriptions and vaccinations. For example, they can create a digital immunization record and provide an application that provides the user with information on what immunization treatments they have had, when the next one is due, and enabling automatic scheduling of appointments with the practice when the users or a member of the family are due for vaccination. This extends the services typically received directly from the doctor, onto an app, and takes the overhead away from the medical practice. While the business case and uptake of such applications are unproven, if uptake is sufficient, it could provide significant efficiency advantages to an industry that is bogged down with administrative overheads.

Objective 3: Rapid Scaling of a New Service to New Markets

Very much associated with the previous examples of trialing new products and then scaling to meet demand is the ability to capitalize on innovative new products and bring them into the organization or scale to other markets easily and quickly to gain competitive advantage in new markets or be able to respond to a disruptive competitor quickly and efficiently. A good example here is the retail banking industry, an industry increasingly facing competition from unlikely sources and often unable to respond quickly enough given the regulatory and security commitments they need to meet. A prime example of this disruption comes from Germany's Auxmoney, a peer-to-peer marketplace for lending money, which essentially uses crowdsourcing to provide loans for specific needs. These kinds of disruptive startups can potentially have a very significant impact on established retail banks. FICO, a startup itself, recognized this trend and developed a solution to enable these disruptive startups to integrate with retail banks. Its value proposition to the banks is essentially acknowledging that banks are never going to be fast enough to innovate as quickly as startups such as Auxmoney. FICO used PaaS tools to assemble a brokerage platform – a "bridge" – that enables the retail banks to:

- Connect to the services that the disruptive startups like Auxmoney provide
- Set up agreements with startups to white label such services and offer them under the bank logo
- Get a share of the crowdsourcing pie that they would otherwise have been excluded from
- Retain customers that they were at risk of losing

These objectives and examples could be applied to virtually every industry, market, and business size. Its relevance is universal, but two major stumbling blocks remain:

- How do you make sense of all this technology when your core business is not technology?
- How do you innovate in a way that still makes sense to business and retains the integrity and security of your corporate environment?

DEMISTIFYING CLOUD, DEVOPS, AND PLATFORM AS A SERVICE

IDC advises IT and business decision makers to focus on the following key learnings:

- DevOps is the methodology of transforming the processes of how software is developed, released, and managed. If implemented to the end, DevOps provides a single, unified, cross-function team responsible for the creation and delivery of business capabilities via software. The team is cross-function in the sense that it includes resources from business units, IT development, IT test, and IT operations.

- In simple words, wherever an organization embraces DevOps as a methodology, it removes the fracture between teams that develop the code (Dev) and teams that have to deploy and maintain the code and the underlying infrastructure (Ops). Decisions on both sides can be better coordinated and made more efficient – the desired outcome is a faster path to software development and business outcomes.

- PaaS is a cloud application development and deployment service consumed on a pay-per-use basis. PaaS services should be seen as toolsets to achieve a business goal, not goals in themselves nor practices.

- PaaS services span a very broad area that includes database services, data ingestion services, mobile application development toolsets, middleware, messaging services, microservices, and docker containers.

- PaaS tools can provide:
    - A "software glue" that connects various data sources, saving developers' time – e.g., data ingestion services
    - A "software mask" that hides infrastructure from the application, giving freedom to developers – e.g., docker containers
    - A "software data engine" that stores and processes data in various formats, saving developers' time – e.g., databases as a service

- PaaS and DevOps have a strong appeal in delivering brand new digital applications, but IDC is aware of several large organizations that have used PaaS tools (e.g., docker containers or databases) as a way to replatform and rationalize their existing enterprise applications. Savings and scalability are the benefits there.

- IDC feels that the biggest challenge with PaaS is that its components are very disparate – resulting in low understanding among customers.

- IDC believes the second-biggest challenge with PaaS is that, if not chosen or implemented correctly, it can create a gap between flexible but "risky" PaaS development environments in public clouds that offer no SLAs or data control, and static but secure on-premises environments. Making sure that plans are in place to bridge that security and SLA gap from the get-go is crucial.

T-SYSTEMS AS A SUPPLIER OF CLOUD PLATFORMS

T-Systems, a subsidiary of Deutsche Telekom (DT), manages hundreds of large customers in the health and public services industries, and focuses its offering on enterprise ICT services. The provider typically works within a framework of hosted managed services/outsourcing, migrating clients' IT to its datacenters and infrastructure, and managing the whole IT and (potentially) application life cycle. A key part of that is related to managed services around SAP environments.

T-Systems delivers IT services to its parent company and, more importantly, to external clients. T-Systems generated €6.1 billion in revenue over the first three quarters of 2015. A growing share of that revenue comes from external cloud services, both in pure IaaS and in areas related to mobility and Big Data analytics.

The company operates a large number of datacenters globally, of which around 20 are enabled to deliver cloud services. At the beginning of 2015, T-Systems set up a Digital Division to focus on scalable platforms and cloud products. Its goal was to connect and digitalize companies and public sector institutions through secure cloud-based products and platforms.

To do that, the Digital Division set up a standardized service offering at the bottom of the solution stack for IaaS, PaaS, and business application SaaS. Within this context, T-Systems launched AppAgile, based on Red Hat OpenShift, RHEL, and in some cases Red Hat JBoss, in March 2015 as its key platform to develop new applications. As a PaaS layer, AppAgile sits on top of T-Systems' pre-existing IaaS infrastructure. AppAgile enables organizations to:

- Develop new rich front-end web applications quickly, without worrying about underlying infrastructure
- Absorb large datasets generated by systems sitting outside of the organizations (e.g., sensors, web traffic, social media) into NoSQL database back-ends
- Analyze large datasets to provide customer intelligence

Since the launch T-Systems has continued to update its AppAgile cloud platform. As an example, it recently upgraded it to support OpenShift version 3, and with it Dockers and Kubernetes – important tools to allow developers to gain even more flexibility in writing web-facing applications. Based on recent conversations with the service provider, IDC believes that additional developments for AppAgile, especially in the multicloud connectivity area, are to be expected over the coming months.

T-Systems' Differentiation

By bringing PaaS options to the table, T-Systems wants to encourage customers to innovate, but it means to do so without forgetting about the fundamentals of running IT operations. Developers often leverage public cloud platforms to come up with innovative applications, and they can do so without restrictions. Troubles start, however, when moving such applications from the "happy" test and development phase into a production environment that has to run 24 x 7, while dealing with data regulation laws or the company's own security practices.

T-Systems aims to ease this path by offering three editions of AppAgile:

- A Shared Edition with lower costs, and low barriers to entry, running on a shared platform.
- A Flex Edition with a flexible pay-as-you-go payment, running on a dedicated platform.
- A Committed Edition with a budget-oriented payment based on a 12-month commitment running on a dedicated platform. The commitment will result in a discount on the platform service.

Both the Flex and the Committed Editions provide customers with a 24 x 7 service, agreed SLAs, and full management of the middleware products. The important aspect here is the simple path from Shared to Flex and/or Committed, as the tools and technologies are unchanged and the data location – in T-Systems' datacenters – remains unchanged. As a result, starting with a proof-of-concept and growing with development and later with market demands is an easy task. Also, the hurdles of shifting applications from test and development to production are minimized.

The other crucial differentiator, especially for organizations planning to leverage cloud platforms to process consumer data, is the fact that T-Systems is a German-listed supplier operating datacenter facilities on European soil – enabling companies to avoid reliance on transnational data protection agreements such as the Safe Harbour Agreement or the Model Contract Clauses.

The Open Source Advantage: Red Hat's Partnership with T-Systems PaaS

Being a large service provider partner, T-Systems quickly developed a peer relationship with Red Hat. The technical and commercial relationship between the organizations has deepened this year, with T-Systems working to add customer-facing layers to OpenShift (billing, documentation, graphical user interface, processes to manage audits) and Red Hat providing the support, updates, and patching flow for the core software elements.

T-Systems provides regular feedback to Red Hat, discovering at times new requirements that it feeds back to Red Hat, such as the workings of the application programming interface (API) and aspects related to using OpenShift as an engine for third-party customers (e.g., resource measurement for billing purposes). The service provider understandably sees itself as something different from a technology reseller, and the relationship has developed in a mutual-learning process, with Red Hat bringing the core software expertise to the table and T-Systems complementing it with experience and requirements from real-life scenarios (e.g., how to avoid SLA breaches, how to develop business cases, ISV involvement). This peer-to-peer, open dialogue is something that both companies are very pleased with. On its side, T-Systems particularly appreciated the open source aspect of OpenShift, and the constant developments in the platform. This enabled T-Systems to keep pace with the industry (e.g., adding docker container support), while maintaining control over the intellectual property of AppAgile.

Challenges for T-Systems

IDC believes that T-Systems and Red Hat have a strong value proposition in AppAgile and OpenShift. However, if they are to expand their revenue and mindshare in the coming months, they need to tackle two major challenges:

- Full-stack providers that deliver IaaS clouds, and in some cases also cloud applications, are moving very quickly on proprietary PaaS technology – in some aspects faster than the open source ecosystem. If such players manage to attract critical mass in the next 18 months, they could restrict innovation on top the cloud and at the same time squeeze the total addressable opportunity for T-Systems and Red Hat.
- Many customers remain unclear about DevOps and PaaS. IDC believes there is a risk that customer adoption could lose steam if T-Systems, Red Hat, and other technology providers and consulting firms don't clearly illustrate how such concepts can strongly influence business outcomes.

ESSENTIAL GUIDANCE

Digital transformation is universal and will continue to disrupt and challenge existing business models across all sectors and company sizes. It also presents a significant opportunity for innovation and competitive differentiation, and business leaders need to start incorporating digital transformation as core to their business strategy and planning.

Digital transformation is intrinsically linked to PaaS and will drive most of its growth in the coming years, opening up new implementation fields for PaaS beyond traditional enterprise environments. IDC expects to see an explosion in PaaS spending; by 2020 in Western Europe we expect that:

- More than half of the tactical users of PaaS will make it into a strategic tool
- More than $5 billion a year will be spent on PaaS

IDC believes that T-Systems, with its Red Hat PaaS platform offering, has developed an offering that speaks to the needs of Western European clients – providing the flexibility and opportunity to innovate on a PaaS platform but in a way that is secure and acceptable to business.

For companies looking to digitally transform, IDC has the following recommendations:

- **Be clear on the business objectives of each project.** Digital projects can be applied to meet a range of business objectives, as outlined in this paper, but without clearly articulating and identifying very clear objectives, these projects run the risk of never being brought to market. Ask whether it brings value to business as well as IT, and work from that point backwards. IT and business must work together to experience the real benefits of key technologies like cloud, analytics, and mobility, and few projects will get off the ground without critical support of both business and IT.

- **Plan for the future and reskill**. Most of today's IT organizations were built around 2nd Platform technologies, and implementing innovative 3rd Platform solutions such as PaaS can require skills and expertise that they currently lack. Revamp your IT organization to become "3rd Platform IT organizations." You should look to become leaner and identify technology providers that will partner with you as you go through this transformation. It is impossible to do it alone. The relationship between you (as the customer) and your technology provider moves from one of a supply relationship to a more collaborative partnership with the joint ambition of leveraging technology to invent and innovate your business process and offerings.

- **Be prepared for business model disruption.** 3rd Platform technologies, such as PaaS, enable changes that extend well beyond the IT organization and touch on your company's core business models. Organizations with new digital transformation initiatives will need to decide whether to maintain old models or incorporate new ones that can help them increase their value by, for example, using cloud service platforms to distribute products and services quickly and to a broader audience.

- **Look at middleware as a critical component.** The PaaS and middleware components of any digital transformation project are often the areas where the success and failure of the whole implementation will be decided. Organizations are recommended to spend a substantial part of their planning time and resources to select and set up a solid software backbone.

- **Consider the advantages of using open standards.** Digital projects can provide business with a real competitive advantage. The intellectual property and data linked to those IT modules become a competitive differentiator. Organizations are advised to think long term and consider open source, industry standard approaches when selecting PaaS and cloud ecosystems to support their digital initiatives, owning and iterating the intellectual property across the organization.

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