

CREATING APPLICATIONS FOR DIGITAL TRANSFORMATION



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Digital transformation is forcing organizations to evolve at a rate faster than ever before. Trends like cloud, mobile, the Internet of Things (IoT) and big data are changing how businesses connect with consumers. As a result, companies are striving to offer new digital products and services to stay relevant and competitive. This means IT has to innovate, develop and deploy at a faster rate to support new applications and business models.

Introduction

What exactly is digital or, more precisely, what does digital mean for you, your business model and your customers? Digital is all about launching new products and services to engage the modern consumer. It involves the monetization of data—leveraging data from customers, partners and back-end systems to create new streams of revenue. A digital business blurs the digital and physical worlds, has more influence on customers, can change business processes and decisions “on the fly” and scales on-demand. Digital business models leverage new trends like mobile, social, cloud, big data and the IoT, and build an API-driven ecosystem for partners. This is vastly different from how business was conducted not so long ago. In the new digital world:

- A traditional bank offers new online banking products to expand into regions where it has no physical presence
- An insurance company complements traditional sales channels with online offerings to target a younger demographic
- A bricks-and-mortar retailer competes with online competitors by offering mobile apps, specialty offerings and innovative loyalty programs

How can you build new digital business applications and fit them into your existing IT landscape? This white paper explains how Software AG’s Digital Business Platform provides the foundation for your next-generation applications. See how the platform supports your digital transformation and delivers the key capabilities you need to succeed in the digital world.

“Digital business is growing. Fifty percent of businesses intend to be a digital business in 24 months, and 83% in three to five years, which will result in high stresses on individuals in organizations.”

— Source: Gartner, Inc., |
Digital Business Is Here Now,
18 March 2015, Jorge Lopez

A look back: where the “spaghetti” begins

From 1995 to 2014, the ERP was where it was at. In enterprise IT, these huge, monolithic environments boasted a consistent architecture and the promise of data integrity, process integration and a single system with customizations. Many companies invested in large apps like SAP® and Oracle®, and here’s where the “spaghetti” begins:

- Point-to-point “spaghetti” connections were established to integrate and synchronize data between these ERP apps and existing applications.
- As SAP and Oracle systems became legacy, companies moved applications like CRM and human resources to the cloud. This created more “spaghetti” since links were needed between cloud and on-premises apps.
- Gateways and portals to connect with customers and partners added more complexity—more apps needed to be connected via more “spaghetti” to SAP and Oracle systems to move more data.
- The mobile revolution and IoT further caused point-to-point integrations to explode by introducing new integration patterns and APIs.

ERPs are complex and large, inflexible and slow, difficult to adapt, and incredibly expensive to operate and to upgrade. Even more important is the risk organizations face to keep this infrastructure operational, as older monolithic applications were never designed to handle tens of thousands of user requests but rather a few hundred users. Imagine a retailer running its order system on a 20th century architecture and launching a mobile app where customers can place orders and check order status in real time. Millions of customers browsing the catalog, accessing data and placing orders would overwhelm the system and bring it down.

In order to deal with all the “spaghetti” involved in connecting ERP systems, many have tried to integrate using a “departmental service bus” or DSB to solve local point-to-point issues. To address challenges in the cloud and solve on-premises-to-cloud problems, some implemented “cloud service brokerages” or CSBs. In addition, companies invested in data warehouses for reporting and BI to understand buying behavior, and eventually transitioned to Hadoop® for data storage.

Some even went so far as to service-enable their legacy applications, touting a modern Service-Oriented Architecture (SOA), though they never really implemented a true SOA with loosely coupled, autonomous services.

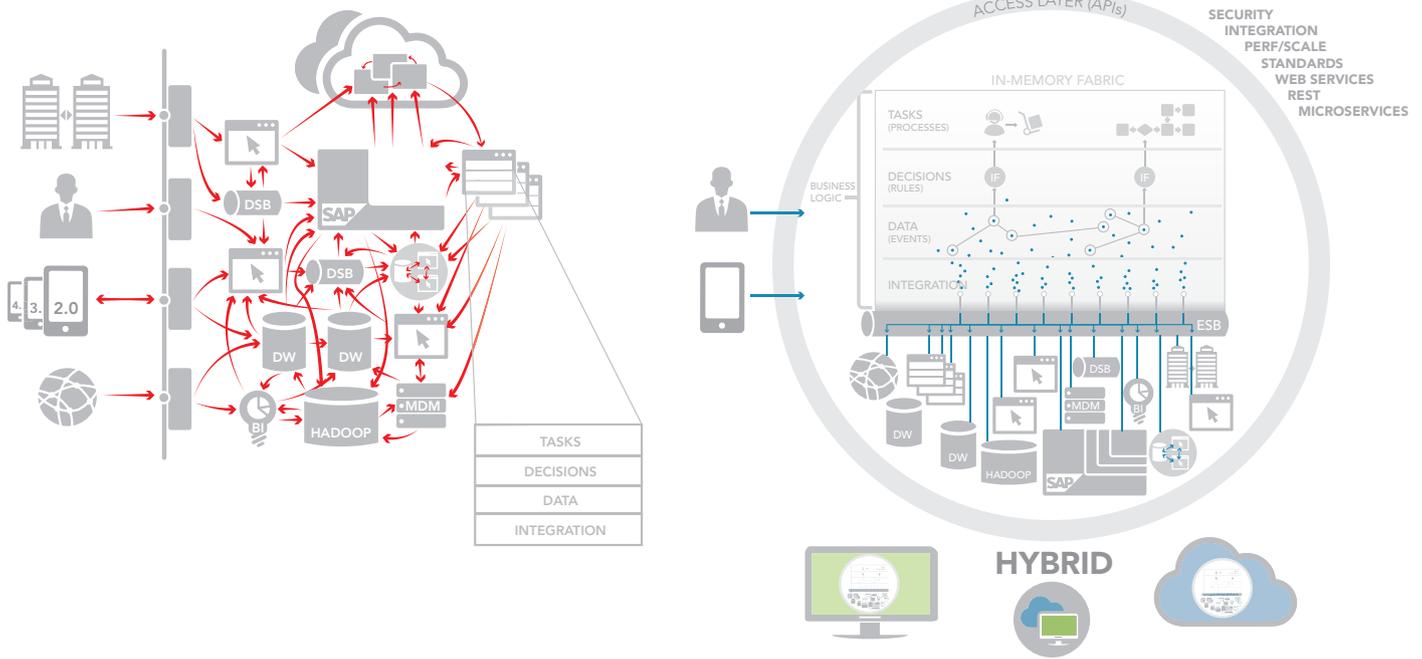
In the midst of all this complexity, the question remained: If applications are the way to differentiate from the competition, what is the best architecture on which to build them?

As any IT expert can tell you, there are many pain points in creating custom applications: the need for coding and business logic, having to take into account security, authentication, authorization, access control and scalability, to name a few. And there’s a lot of double work. Every time a new standard, like SOAP, XML-RPC, Protocol Buffers or REST, is introduced, another version of the app has to be created. Over time, more and more applications are created, resulting in silos. In many cases, the same apps are created over again because there isn’t a good way to re-use what was built before. This evolution has added to today’s CIO’s challenge: bringing down costs while differentiating the business with innovation.

How do CIOs transform into Chief Innovation Officers? Studies indicate CIOs spend 79 percent of their resources just trying to keep the lights on, leaving only 21 percent for innovation. In fact, every time a CIO adds another component to an already complicated architecture, it puts additional pressure on the meager 21 percent of resources available for innovation.

Organizations clearly need a way to leverage what they have in order to drive innovation while helping to simplify their complicated “spaghetti” architectures. No enterprise can afford to start from scratch, nor would any company want to throw away its huge investment in IT.

Software AG’s Digital Business Platform provides the solution.



The old and the new: Here's the old "spaghetti" architecture of the past compared to the modern and agile Digital Business Platform, the foundation for digital transformation.

Digital needs a modern architecture

Monolithic architectures are no longer suited for the types of digital apps needed by businesses today. The shift toward a lightweight, microservices-oriented design, in fact, puts a big question mark on existing architectures and their suitability to support and sustain various application patterns. Applications that no longer rely on the standardization offered by ERPs, CRMs and other such solutions demand flexibility, speed and agility.

Today's Digital Enterprises need applications that provide differentiation from the competition. To build those applications, businesses need an underlying architecture with a set of capabilities that's missing from monolithic architectures:

- **In-memory data management** for achieving extremely low, predictable latency at any scale, enabling applications to scale without degradation to improve the customer experience across all channels
- **Event-Driven Architecture (EDA)**, which can scale to process billions of streaming mobile/IoT events and, at the same time, correlate and identify patterns across them; an architecture that combines the events and data for customer and business process analytics
- **An elastically scalable integration layer**, which integrates virtually every IT system while exposing and enabling APIs for internal systems and external partners to build an ecosystem for digital products and processes
- **Process and data analytics** to analyze and document complex business processes and track and monitor KPIs
- **Robust high-speed messaging** to build highly decoupled applications and services and future-proof applications and services against large-scale changes
- **An application platform** that can be packaged and scaled using container-based deployment architectures like Docker®

This modern architecture supports the ever-increasing need to become more connected to customers, suppliers and partners in the digital age and to increase visibility within the business while performing analytics—not only on data at rest but on data in motion.

“Forecasts project some 21 billion connected “things” in the digital universe by 2020. With data volumes generated by the IoT expected to dwarf those of social media, information leaders must begin now to identify the requirements necessary to support adoption and implementation of IoT capability.”

— **Source: Gartner, Inc., |**
 Why the Internet of Things Will Dwarf Social (Big Data),
 5 February 2016, Michael Patrick Moran

The Digital Business Platform: foundation for digital transformation

Ready to transform your IT architecture for digital apps? With Software AG's Digital Business Platform, you can leverage your business logic in a way that allows for faster innovation of applications as well as simplified development, deployment and maintenance.

Let's examine the primary capabilities of Software AG's Digital Business Platform from the ground up.

Integration of everything

Core to the Digital Business Platform is an integration layer that connects all IT systems: legacy (mainframes), systems of records like SAP, CRM and any custom-built apps. You gain more than just an Enterprise Service Bus (ESB) for connectivity. You also get a lightweight container for building applications that can access data from both on-premises and cloud apps. In addition, a robust messaging system enables you to build highly decoupled services when you adopt a microservices or Back-end For Front-end (BFF) architecture. You can connect with external partners seamlessly and access data and transactions using traditional B2B standards (such as EDI) and modern APIs (such as RAML® and Swagger).

Software AG's Digital Business Platform has these key integration capabilities:

1. Supporting open standards and a polyglot programming and database model, the platform is a lightweight container that scales up or out based on IT needs. Due to the small footprint, it can be deployed inside a Point of Sales (POS) system within a store or in a massively horizontally scalable implementation across hundreds of nodes. You can connect a handful or hundreds of applications, including sensors and Hadoop-based systems.
2. Services hosted in the platform are "hot swappable" and can be changed safely while the container is still running. This feature makes it very relevant to the microservices architecture; as microservices change, the corresponding services on the integration platform can be changed without bringing down the container.
3. As the security, authentication and mediation needs grow, the platform acts as a gateway, providing routing and mediation services that are a key part of both API and microservices architectures. This becomes even more relevant as you need to expose functionality externally to partners and clients within your digital ecosystem. You can securely expose data and functionality to external partners via APIs or even mobile apps while, at the same time, achieve the scalability and performance to handle hundreds of thousands of calls per second.
4. Built-in multi-domain master data management improves enterprise data quality. As the number of applications accessing data sets grows, this critical capability essentially "spell checks" your data and transactions, reducing errors and improving efficiencies and customer satisfaction.

Event-centricity to keep your digital business responsive

The ability to analyze and respond to high-volume transactions and customer interactions as they happen is critical in a digital world. Analyzing data at rest using traditional Business Intelligence (BI) tools provides very little value in making real-time decisions. By correlating, aggregating and detecting patterns across fast-moving data from multiple streaming sources, Software AG's Digital Business Platform enables you to put real-time events in context and analyze events as they occur. If the application is the body and data is the blood, this layer is like the brain: It gives you intelligence on data in motion and enables you to react when events actually occur.

What's unique about this capability?

1. Unlike traditional approaches to event processing, streaming analytics doesn't store data or indexes, thus giving it a simpler and more efficient architecture that's suited to the event processing of big data in motion. You can also compare that data with historical trends using traditional BI to look at data at rest if needed to determine the next best action.
2. The platform compiles highly optimized machine code to execute complex operations faster than traditional languages, such as C or Java®, to ensure microsecond response times remain consistent—even as data volumes grow.
3. You can easily implement IoT applications, which require millions of sensor data streams to be analyzed and correlated per second. Similarly, you can develop other smart applications, such as smart order routing, real-time pricing, cash flow risk management, real-time fraud detection, and market surveillance and monitoring, using the Digital Business Platform.
4. A self-service, real-time data visualization and exploration tool combines data from different live information sources to create dashboards that can be displayed on any device. With this tool, you can combine your transaction data with new data from any source—data warehouses, big data platforms, news feeds, social media, BI systems, streaming data and even Microsoft® Excel® spreadsheets—to create real-time mashups on a dashboard to get a new perspective and make better decisions. Data visualization in real time lets you stay on top of constantly changing business data.

Pattern detection for smarter decisions

In a complex business world, stakeholders in IT and business need to define and change rules that drive processes "on the fly" without any development work. The Digital Business Platform reduces need for human intervention drastically by externalizing business or pattern matching/detection rules in a separate services layer. This capability enables you to automate even the most complex decision-driven processes. Clear policies and procedures can be outlined consistently and applied across channels, systems and processes resulting in increased accuracy.

Here's why you should care:

1. Externalizing and automating decisions is the key to process and business agility. For complex business decisions, rules-based processing accelerates your response time to business threats and improves your time-to-market.
2. Using fewer resources to change decisions quickly, decision-centric apps help you meet SLAs to lower fines and legal costs from bad decisions. This method of implementing and changing decisions can lower your IT costs.
3. An event-driven architecture style with decision-driven rules can automatically handle exceptions (or errors) and mitigate resulting risks to your business. For example, a delayed shipment can be converted into a customer discount, automatically resulting in a better experience.
4. Decisions based on credit score, shipment value, and age of customer, for example, can be automated by rules for applications, such as credit approval and returns processing.
5. Advanced visualization capabilities allow for user-controlled decisions as well as automated decisions.

Process-centric apps for efficient task management

If your company is like most, it's organized in business units with business processes spanning across them. Process inefficiencies arise as the units operate in silos, and there is little or no visibility across business lines. Sharing and managing tasks across large, multiple teams can become unmanageable. Uncoordinated collaboration may cause unforeseen issues, such as missing audit trails or incorrectly routed tasks. These complexities and inefficiencies can be resolved with task- or process-centric apps that orchestrate a complex task across business lines.

This capability can revolutionize the classic business. Here's how:

1. Changing all apps involved in a task can be expensive and complex. By using a task-centric app, you can minimize changes to individual apps while routing data and supporting documents across business lines. The benefits include reduced duplicate data entry, manual processes and workarounds.
2. Task-centric apps allow people to rapidly create and change processes—with close collaboration between business and IT. Such apps are designed to absorb process changes as new products and services are launched, with little or no impact on the underlying systems of record.
3. People across the business gain real-time insight into business activities. By analyzing KPI trends to proactively adjust the task execution, they can discover issues and exceptions and ensure escalations are dealt with quickly and efficiently without impacting customer satisfaction.
4. In post-M&A integration, apps built using the task-centric model can be extended easily to assimilate new systems and processes with relatively minor changes. Such task-centric apps are suitable for complex processes like loan origination and insurance claims processing.

All of these task-centric apps are powered by a high-performance in-memory data fabric and connected by low-latency messaging for extreme scalability and millisecond response times. The platform can process huge data volumes, making it an essential tool to master the demands of the IoT.

Custom services and complete applications can be developed with either native coding or visual tools. That means both seasoned software developers can create highly customized coded applications while business people (or "citizen developers") use visual development tools to build sophisticated applications with minimal help from IT. The development environment can be accessed through APIs. Customizations can be configured without hard coding.

Your business can build specialized content on this foundation—content that differentiates you from the competition. Any department that engages in customer-facing interaction—marketing, sales, support, e-commerce—can quickly create highly customized yet lightweight applications.

Take the next step

In the digital world, standard applications of the past 10 to 20 years no longer make the grade. Their purpose was to standardize and integrate back-end business processes. They were not designed to adapt quickly or support innovation. Your Digital Enterprise demands a different approach: You must stand out from the competition with innovation and rapidly changing processes. Your applications must adapt continuously and quickly, giving you the agility you need to differentiate from the competition.

With standard “off-the-shelf” applications, the application and its logic were the primary focus. The underlying infrastructure was secondary. That is why standard applications were so difficult to adapt to individual needs. What is revolutionary about the application infrastructure of the Digital Business Platform is that development of applications is now based on the infrastructure. That’s why the Digital Business Platform is the essential tool to help you master the challenges of digitization.

With Software AG’s Digital Business Platform, you can expect:

1. **Agility**—Pre-integrated components provide the fastest way to build, deploy and manage complex apps.
2. **Comprehensiveness**—You can use this wide range of pre-integrated capabilities to build a wide range of digital apps without the need to mix-and-match technologies from different vendors.
3. **Maturity**—The platform is proven, trusted by the world’s top brands; it’s a mature and battle-tested platform that allows for extreme scale, speed and performance. Because of the platform’s maturity, you can develop and deploy a complex microservices architecture, a simple three-tier architecture, or any combination of different architectural styles.

Software AG recommends a container-based deployment system that can work concurrently with your existing service-oriented architectures using a hybrid model. Using a single integration backbone to connect all ERP, CRM, cloud-based applications, home-grown applications and legacy systems, Software AG’s Digital Business Platform presents a well-planned and disciplined approach for building applications for your digital transformation. You can rapidly create a single infrastructure to connect applications on-premises and in the cloud. Taking a hybrid approach will enable you to benefit from the advantages of cloud solutions.

The answer to the age old question: “to buy or to build?” is now: buy AND build! Your enterprise can use the Digital Business Platform to build the next generation of applications tailored to your individual requirements.

Software AG considers the hybrid model as the clear winner for both security and flexibility and can provide a cloud-based suite that covers enterprise integration and automated solutions that fit around your requirements, not the other way around. A hybrid approach works because of the combined benefits:

- Public for maximum flexibility and efficiency
- Private for maximum control
- On-premises for compliance and privacy

Ultimately, your choice of deployment model will be guided by your data security requirements, which will determine how much of the public cloud you'll use and what will be kept private or on-premises.

If you're ready for your digital transformation, talk to your Software AG representative, or visit www.softwareag.com, to learn more about the Digital Business Platform. Build your digital future on the platform made for smart digital applications.

"Anyone who believes that digitization is a passing trend is completely mistaken. Digitization won't stop, not now, and certainly not in the future. It's better to get on board than to stick your heads in the sand and hope for the storm to pass."

— **Dr. Wolfram Jost** | Chief Technology Officer, Software AG

ABOUT SOFTWARE AG

Software AG offers the world's first Digital Business Platform. Recognized as a leader by the industry's top analyst firms, Software AG helps you combine existing systems on premises and in the cloud into a single platform to optimize your business and delight your customers. With Software AG, you can rapidly build and deploy digital business applications to exploit real-time market opportunities. Get maximum value from big data, make better decisions with streaming analytics, achieve more with the Internet of Things, and respond faster to shifting regulations and threats with intelligent governance, risk and compliance. The world's top brands trust Software AG to help them rapidly innovate, differentiate and win in the digital world. Learn more at www.SoftwareAG.com.

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