SAP Thought Leadership Paper
Mobility Application Development Software

Modern Technology Platform

Orchestrated Accelerated Innovation

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With enterprise mobility, in-memory computing, and rapid analytics from SAP, you can combine cutting-edge technology with proven building blocks to develop a modern software environment to support your business requirements as never before. Read on to get high-level guidance on how to orchestrate the main building blocks of this highly configurable, customizable new technology and what tools deliver top results.

Modern Technology Platform

Actively accelerating innovation has become a necessity for IT in order to keep pace with the rapid evolution of technology, globalization, and quickly changing business requirements. In the context of SAP® applications, Figure 1 shows examples of innovation domains being pursued by SAP customers. They include:

- Finance – You want a flexible general ledger with powerful, real-time reporting, dashboards, and integrated planning; solutions for central financial investment and budgeting control; and real-time connections to banks to supervise working capital and bank balances.
- HR – You must move beyond just managing your workforce to simulating the impact of organizational changes and performing strategic workforce planning.
- Sales – You are looking for solutions to create your own catalogs with your own prices. You want to track and analyze the buying behavior of your customers, simulate the impact of pricing and rebates, optimize pricing and rebate strategy, and present data-based scenarios for boardroom decision making.
- Custom-built solutions – You want to build innovative business solutions by assembling and configuring SAP software components in unique ways, with the possibility of adding your own application logic and coding.

THE NEW TECHNOLOGY

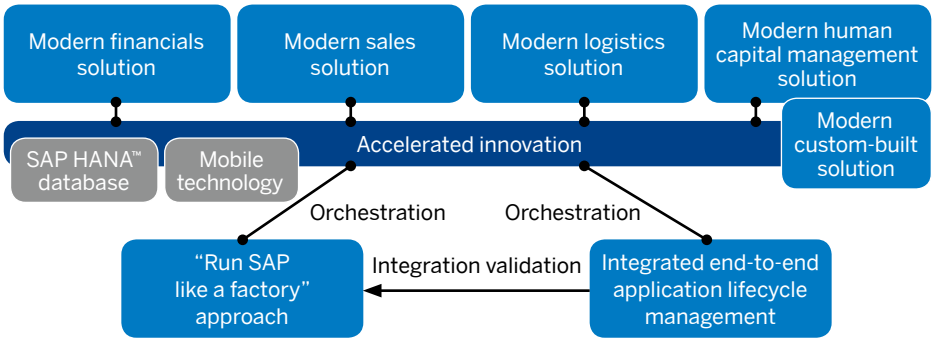
SAP in-memory computing and the SAP HANA™ platform provide you with a new integration layer for your business applications and a degree and scale of real-time integration not possible before. The new application layer accommodates all your business applications and allows you to build your own specific solutions.

The modern technology platform supports all standards and methodologies you need to achieve high availability, performance, upgradability, and scalability. You also get secure extensions to your custom code and custom-built SAP solutions, allowing you to support them as if they were standard SAP solutions.

The SAP Solution Manager application management solution covers and manages all components of your solution and fully supports such strategic processes as application lifecycle management and integration validation. It delivers support for well-defined product, solution, and operations standards and dovetails with specific support services, guided procedures, and expert-guided implementations.

Adopting SAP Solution Manager can help you reduce total cost of implementation and operation, free up time and resources for innovation, and help protect your investment in implementation projects.

Figure 1: Building Blocks of Accelerated Innovation



Custom-engineered and powered by SAP® Solution Manager

Orchestration of Software Components

SAP IN-MEMORY COMPUTING

In-memory applications are developed and delivered on a memory-based data management layer for transactional business applications and for planning, data warehousing, and business intelligence (BI) tools. The new in-memory database layer accelerates existing applications considerably and enables new types of applications that could not be run in the past.

The functions of SAP in-memory computing dramatically improve operation of existing and future applications, provide a foundation for accelerated innovation, and protect your investment in all past and future investments. The SAP HANA™ platform is the technical foundation of applications that utilize in-memory computing. SAP HANA appliance software combines SAP software components that have been optimized for the most advanced hardware SAP partners provide and deliver (see Figure 2).

Any current application that runs with a database supported by SAP software and real-time data replication to SAP HANA can be accelerated. Typically these are applications that perform high numbers of read accesses and calculations and then post results in the SAP ERP application. Here are some examples:

- Settlements for financial accounting and profitability analysis
- Order rescheduling
- Project settlement
- Customer- or vendor-specific catalogs and pricing calculations

In addition to its immediate benefits, the SAP in-memory computing technology supports real-time data warehousing, making it your logical choice for strategic planning. New horizons open up as well for financial planning, investment and budget planning, and demand and supply chain planning software.

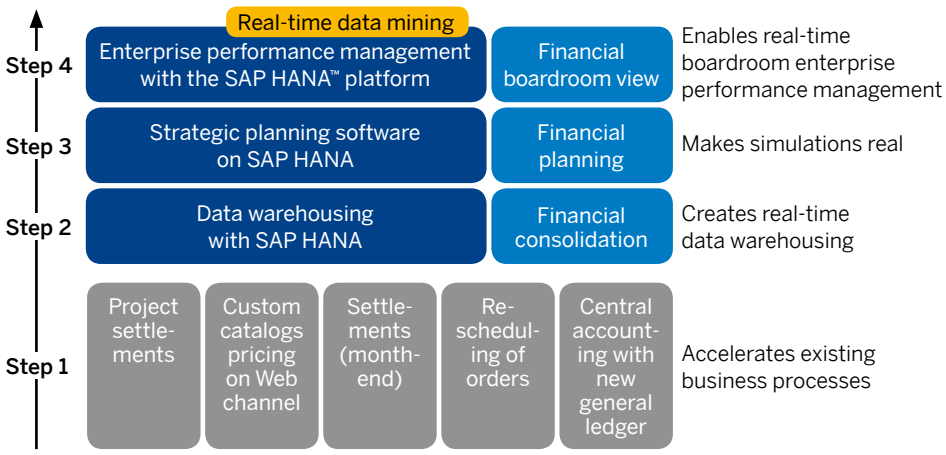
But the term "planning" is no longer appropriate. Planning in minutes assumes de facto simulation and optimization runs not possible yesterday due to time and resource constraints. Real-time data warehousing allows boardroom reviews of real-time data, ushering in a completely transformed reality for enterprise performance management. In combination with mobile devices, real-time analytics enable field applications to generate unprecedented business support and value. All of this can be realized on the SAP HANA platform.

Product Strategy

The product strategy for SAP in-memory computing relies on the product strategy of the SAP HANA platform as the key foundational component for the next generation of analytic, planning, and transactional applications from SAP. Nevertheless, the overall product strategy of SAP in-memory computing can be divided into the following categories:

- **In-memory analytics** for flexible real-time analysis of operations at a nonaggregated level
- **Next-generation applications** for real-time operational planning, simulation, and forecasting, for example, the SAP NetWeaver® Business Warehouse (SAP NetWeaver BW) component, powered by SAP HANA
- **One store for data and analytics** to reduce software landscape complexity and transform the value chain, for example, SAP Business Suite software optimized for SAP in-memory computing

Figure 2: Value Road Map for the SAP HANA™ Platform



Examples of Accelerating Business Processes

An example of accelerating a business process can be seen in using SAP HANA for operational analytics. This involves the replication of operational data from SAP Business Suite software into memory and immediately applying analytic models to that data. Besides getting outstanding query performance on operational data, you gain great flexibility in creating new models and rapidly customizing business data content. Innovation is introduced in an entirely nondisruptive manner. All your existing investments remain in place, fully functional and ready to be reused.

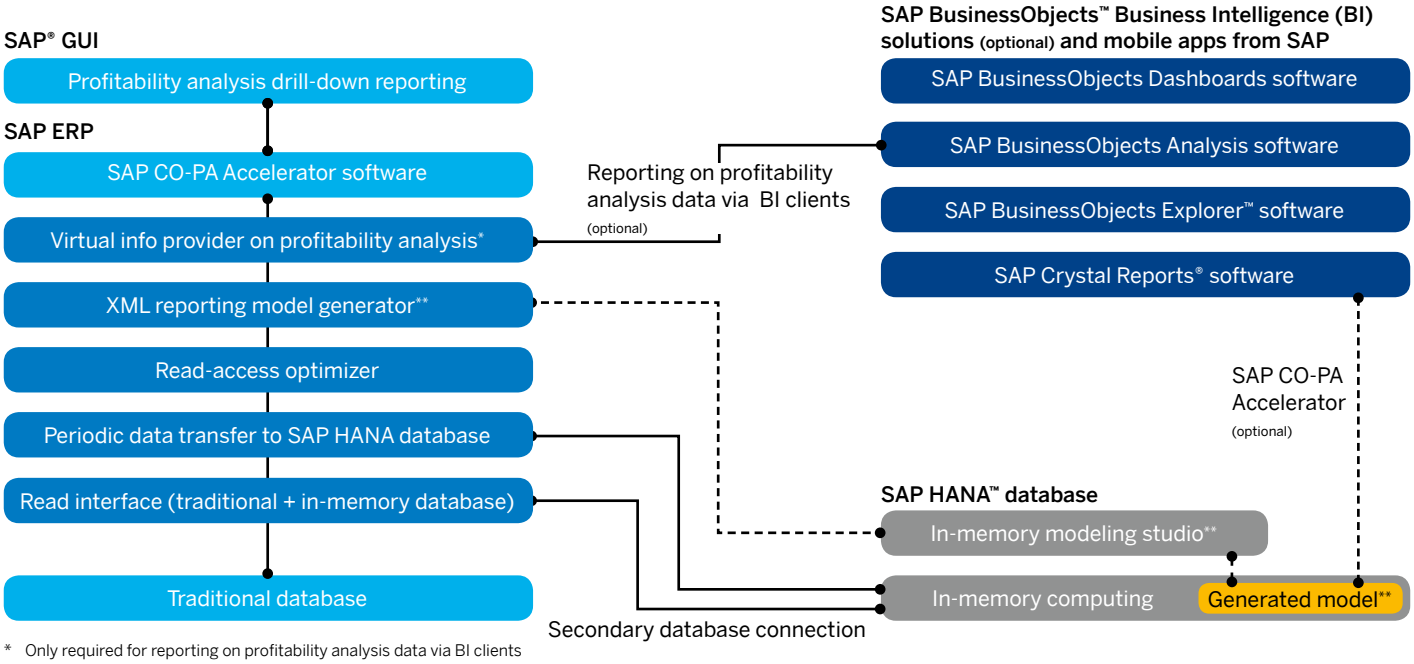
Another example has been realized by the SAP CO-PA Accelerator software, which integrates SAP HANA into the system architecture for a productive SAP ERP application to perform profitability analysis. Figure 3 shows the architectural elements of the SAP CO-PA Accelerator software embedded in a solution landscape consisting of SAP ERP, SAP HANA, and the SAP BusinessObjects™ Business Intelligence (BI) platform. The enhanced read-module of SAP CO-PA dramatically accelerates the generation of classical profitability analysis reports within SAP ERP.

SAP NetWeaver BW, POWERED BY SAP HANA

SAP NetWeaver BW, powered by SAP HANA, supports full in-memory-enabled data warehousing. The immediate major benefits delivered by SAP NetWeaver BW are:

- Enhanced scalability and performance for faster decision making, significantly accelerated data load performance, and delivery of next-level performance by SAP NetWeaver BW Accelerator software

Figure 3: SAP® CO-PA Accelerator Software



* Only required for reporting on profitability analysis data via BI clients

** Only required for reporting on profitability analysis data with SAP HANA

- Increased flexibility through the integration of SAP BusinessObjects BI solutions and SAP BusinessObjects enterprise information management (EIM) solutions, including tighter integration with SAP BusinessObjects Data Services software and SAP BusinessObjects Metadata Management software
- Simplified configuration and operational management, including an administration cockpit integrated into SAP Solution Manager and wizard-based software configuration

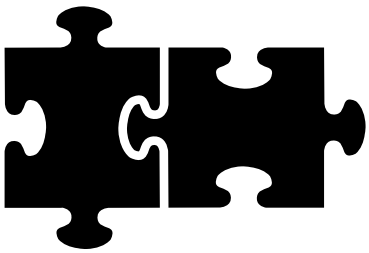
SAP NetWeaver BW, powered by SAP HANA, is an integrated engine for data management and in-memory processing for analytical purposes, which requires no reimplementation. The major benefits are:

- A merge of the database and SAP NetWeaver BW Accelerator into one instance for lower total cost of operation
- Simplified administration through one set of administration tools, for example, for data recovery and high availability
- Column-based storage with a high compression rate and significantly less data to be materialized
- Reduced materialized layers, eliminating an aggregation layer on top of data warehousing layers
- Improved load performance for data store objects via a built-in activation process
- Excellent query performance as proven with SAP NetWeaver BW Accelerator
- No special efforts necessary for achieving fast reporting on any database object
- Accelerated planning functions based on in-memory computing technology
- Conversion without reimplementation for nondisruption of existing deployments

Sample Solution Landscape for In-Memory Applications

A potential deployment for SAP HANA within an SAP solution landscape demonstrates the value of next-generation BI software. The solution landscape could consist of SAP ERP, SAP NetWeaver BW, and the SAP BusinessObjects BI platform. SAP ERP could be replaced in this solution landscape with the SAP Customer Relationship Management (SAP CRM), the SAP Supplier Relationship Management (SAP SRM), or the SAP Supply Chain Management (SAP SCM) application.

With enterprise mobility, in-memory computing, and rapid analytics from SAP, you can combine cutting-edge technology with proven building blocks to develop a modern software environment to support your business requirements as never before.



Orchestration of Applications

In-memory applications come with built-in orchestration for application lifecycle management and the "run SAP like a factory" approach to accelerate innovation. In addition, the SAP Active Global Support (SAP AGS) organization offers continuous quality checks for smooth going-live events and high continuity of operation. Guided self-services like the SAP EarlyWatch® Alert service help standardize configuration and maintain stable operations. Figure 4 gives an overview of these topics, which are covered in more detail in the next sections.

APPLICATION LIFECYCLE MANAGEMENT

Application lifecycle management manages change while keeping the quality of implementations and deployments high. Based on a single source of truth for the configuration and flow of implemented business processes, it reduces the cost of blueprinting, implementation, deployment, and operations while keeping quality high. The following sections briefly discuss different aspects of application lifecycle management.

Solution Documentation

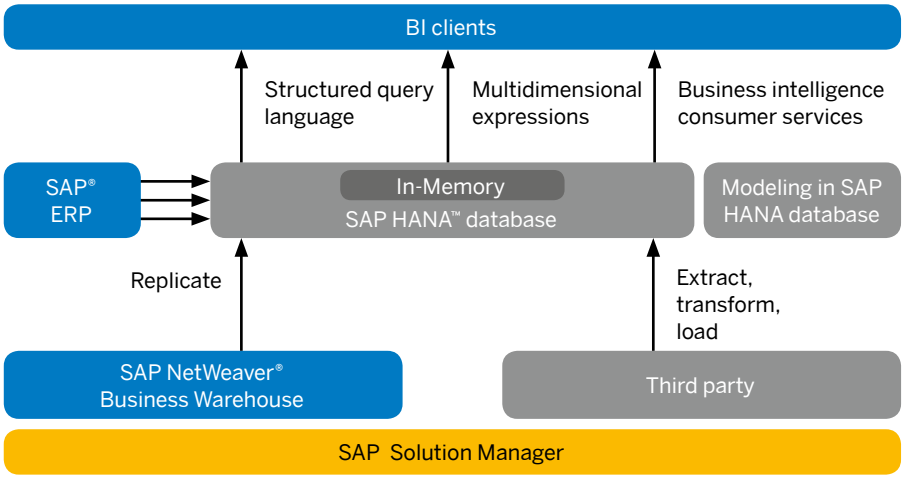
All server components – including SAP HANA, the SAP BusinessObjects BI platform, SAP Business Suite applications, and SAP NetWeaver BW – become registered with SAP Solution Manager, which maintains the single source of truth. The application always provides up-to-date information about software deployment and the technical layout of the software. It contains documentation of the core business processes integrated with in-memory applications and of the data replication method used for the near-real-time reporting.

Technical Operations of In-Memory Computing

The technical operations of application lifecycle management represent all administrative tasks, including the start and stop of processes, backup and recovery, and parameter configuration. These tasks can be managed centrally from SAP Solution Manager for all databases, including in-memory databases.

Even though the SAP HANA database holds the bulk of its data in memory, it still uses persistent storage to provide a fallback in case of failure. For example, in case of a power failure, the database can be restarted like a normal disk-based database, after which it automatically returns to its last consistent state. A database administration cockpit in SAP Solution Manager centralizes and standardizes the database administration work for all connected databases. In addition

Figure 4: Orchestrating Applications Using In-Memory Computing Technology



Application lifecycle management
- Database administration and high availability
- End-to-end change control
- End-to-end testing

"Run SAP like a factory" approach
- End-to-end root cause analysis
- End-to-end exception management

Continuous quality checks
- Build: Implementation and configuration checks
- Run: SAP EarlyWatch® Alert service
- Best practices: Configuration, performance, troubleshooting, tuning, and operation guides

to all this, support for very specialized in-memory database tasks is available with the SAP HANA studio.

SAP has worked with its partners to develop a range of high-availability solutions, which are already in use by many customers for normal disk-based database software systems. The same level of high availability can be achieved for in-memory technology for a log shipping and dual data center, for example, or for hot standby.

End-to-End Change Control

In-memory applications are always part of distributed and complex software environments, where change control management plays a crucial role. Methods and tools are required to manage functional and technical changes to solutions across components, for example, SAP ERP, SAP HANA, and the SAP BusinessObjects BI platform. Standardized processes, methods, and tools provide full transparency and support the continuous quality of the change processes during the application lifecycle. SAP Solution Manager supports this with functions specific to change request management, integrated project and quality gate management, central transport and deployment, and configuration validation.

Test Management

Test management defines the requirements and scope of integration testing based on a change impact analysis. It supports the development of automatic and manual test cases, management of the testers, and reporting on test progress and test results.

Maintenance Optimization

Maintenance optimization covers software correction packages from discovery and retrieval to test scope optimization and including optional automatic deployment to the production environment. The maintenance optimizer functionality supports all components of in-memory applications, including all connected software – SAP HANA, the SAP BusinessObjects BI platform, and SAP BusinessObjects Data Services.

Identity Management and Single Sign-On

In a complex software landscape, user accounts can be centrally managed with the SAP NetWeaver Identity Management (SAP NetWeaver ID Management) component to cover SAP and non-SAP software. Based on an authoritative, single source of user information, the software supports self-service management of user information and authorizations using workflows. The SAP NetWeaver Single Sign-On application centralizes, secures, and simplifies the way users log on to applications in your IT landscape. In-memory applications based on SAP HANA integrate into your existing authentication processes via single-sign-on functionality, thus providing state-of-the-art security.

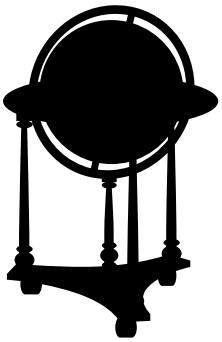
"RUN SAP LIKE A FACTORY" APPROACH

Managing exceptions and incidents is a core task of solution operations. SAP Solution Manager provides a framework you can use to develop an operations platform. With this operations platform, two full-time staff members per shift can run your SAP solutions.

Database Monitoring and Root Cause Analysis

All databases including SAP HANA databases can be accessed via a remote database connection. This is possible even if a database is not linked to SAP software. With the database administrator cockpit, you can monitor SAP HANA databases and include them in the end-to-end database analysis.

The modern technology platform supports all standards and methodologies you need to achieve high availability, performance, upgradability, and scalability. You also get secure extensions to your custom code and custom-built SAP solutions.



The SAP HANA studio includes all of this and very specialized functions for in-memory database monitoring and analysis as well. In SAP Solution Manager, a remote connection can be established to the SAP HANA studio to enable fast analysis.

End-to-End Root Cause Analysis
All server components – SAP HANA, the SAP BusinessObjects BI platform, SAP Business Suite applications, and SAP NetWeaver BW – can be included in end-to-end root cause analysis performed by SAP Solution Manager. The analysis includes workload, exception, and change analysis. In-memory applications can undergo an end-to-end trace analysis that covers BI clients, middleware components, the SAP HANA database, and its stored procedures. This provides end-to-end visibility for single-user activities from the BI front-end software through to the SAP HANA databases.

Technical Monitoring, Alerting, and Reporting
All server components are covered by the system and application-monitoring functions in SAP Solution Manager. This means the existing integration for alert processing can be used for incident management and notification management as well. Alerts for the SAP HANA database are included in this workflow of exceptions via the database administrator cockpit.

BI Monitoring
SAP BusinessObjects BI solutions can be monitored using the technical monitoring work center in SAP Solution Manager. SAP NetWeaver BW and SAP BusinessObjects Explorer™ software serve as the basis of this functionality.

BI monitoring helps you answer the following questions:

- Is the performance of the most important process chains high? Do they finish successfully?
- Are jobs executed as planned? Is their performance high?
- Are there delays in processing your process chains that hinder in-time delivery of business-critical data?
- Is there a resource bottleneck anywhere impeding your BI solution? Are you automatically informed when there is?

BI monitoring does the following:

- Monitors process chains and single steps in process chains
- Centrally monitors specific jobs and correlates them to system-specific metrics
- Integrates alerts; includes notification management, incident management, and task assignment; and forwards to third parties

SUPPORT SERVICES OF SAP AND EXPERTISE ON DEMAND

The quality check service performed by SAP consultants of in-memory applications can help you reduce risk during the implementation of your SAP HANA platform. The service is delivered as part of the SAP Safeguarding portfolio of services and is fully aligned with application lifecycle management and the "run SAP like a factory" approach.

The quality check service for in-memory applications offers support for best practices and assessments. It also delivers the tools you need to reduce the technical risk and cost associated with an implementation of the SAP HANA platform. The check helps you complete your SAP HANA implementation as quickly, efficiently, and cost-effectively as possible. With expertise on demand, you establish contact with SAP engineers when you need answers to specific questions related to configuration and operation.

During the run phase of your implementation project, the SAP EarlyWatch Alert service monitors your most important business processes and software, including in-memory applications. SAP EarlyWatch Alert identifies potential problems early, reveals bottlenecks, monitors the performance of your software, and provides details on regular administrative tasks. Checks specific to SAP HANA can be included in the SAP EarlyWatch Alert service right from the beginning within the SAP Business Suite software integrated into the software landscape.

The SAP Solution Manager application management solution covers and manages all components of your solution and fully supports such strategic processes as application lifecycle management and integration validation.

Orchestration of On-Device Solutions

Mobility is the new way people communicate, work, live, and conduct their transactions. Quickly adopted in the private sphere, the technology is transforming how businesses are run, and enterprises are rapidly unwiring themselves. Mobile devices have become the preferred means for accessing and sending information for both private and business purposes.

Mobility has introduced an unexpected difference: it's got to be easy to use. Because the devices are constantly shrinking in size, there's no room for user manuals. So while the mobile device is becoming the new desktop – connecting the boardroom to the shop floor to the supply chain to the consumer – the people it empowers have got to intuit how it works, or rather it's got to work the way they expect it to. For user interface design, that's a tall order – but one that's being successfully fulfilled on a regular basis.

In another important shift, employees are choosing what devices they use, expecting their organizations to support them, and businesses strive to comply. Businesses realize that a mobilized workforce is more productive. Employees can now do their job anytime and anywhere. This improved productivity serves as a catalyst for revolutionizing existing processes, resulting in dramatic productivity improvements. With widespread adoption of smart mobile devices, companies can also increase business transactions with their customers to strengthen customer loyalty.

Mobility poses challenges to the enterprise as well. Technical concerns such as security, data latency, and device management are particularly prevalent. In addition, mobile business applications are connected to mission-critical on-premise SAP solution landscapes and have become part of core business processes. This means they must comply with existing operations and change-management standards and be integrated into the respective processes and tools.

Addressing these challenges effectively is a key competitive differentiator of SAP as a provider of orchestrated, end-to-end solutions. SAP is enhancing its offerings in the area of application lifecycle management and the "run SAP like a factory" approach based on SAP Solution Manager. This facilitates the implementation, deployment, operation, change management, and continuous optimization of mobile business applications in the same way that these processes are applied for any SAP application.

GENERAL ARCHITECTURAL CONSIDERATIONS

Historically, mobile deployments have been departmental or siloed projects within an organization. Today we see that enterprises are taking a more strategic approach to enterprise mobility. This approach involves choosing a software environment that will be flexible and robust enough to support a broad range of mobile applications across the entire enterprise – from field workers to information workers to executives. By using a broad approach, enterprises are able to deploy a mobile infrastructure that supports a heterogeneous device environment that can address current and future mobility needs.

This software environment for the development of mobile solutions must balance end-user and enterprise requirements. End-user requirements include ease of use, freedom of device choice, and access to a wide range of mobile applications. Enterprise requirements include reasonable total cost of development and ownership, security, and supportability. The mobile applications must be relatively easy to develop, configure, deploy, and upgrade over the lifecycle of the SAP software–centric landscape. The software environment must manage and securely operate a large number of applications and users with high quality and at reasonable cost. All high-level components required for developing, deploying, and operating mobile applications should be integrated. This encompasses a set of mobile client technologies – software developer kits and reusable libraries – along with design tools that enable the creation of attractive mobile applications on all types of devices.

MOBILE APPLICATIONS – HIGH-LEVEL ARCHITECTURE

An architecture that supports online and offline applications is shown in Figure 5. Online mobile applications are Web-like applications, where the device requests data from the back-end software. Additional features include the following:

- The applications require connectivity but can also handle occasional disconnects when data is cached on the device.
- There is no need to perform up-front mass data replication to and from the device.
- The architecture is based on open standards such as Open Data Protocol (OData) and OpenSearch technologies, making it easy for developers to build online mobile applications.
- A scalable representational state transfer (REST) architectural style is applied, making it possible for the applications to reach many people.

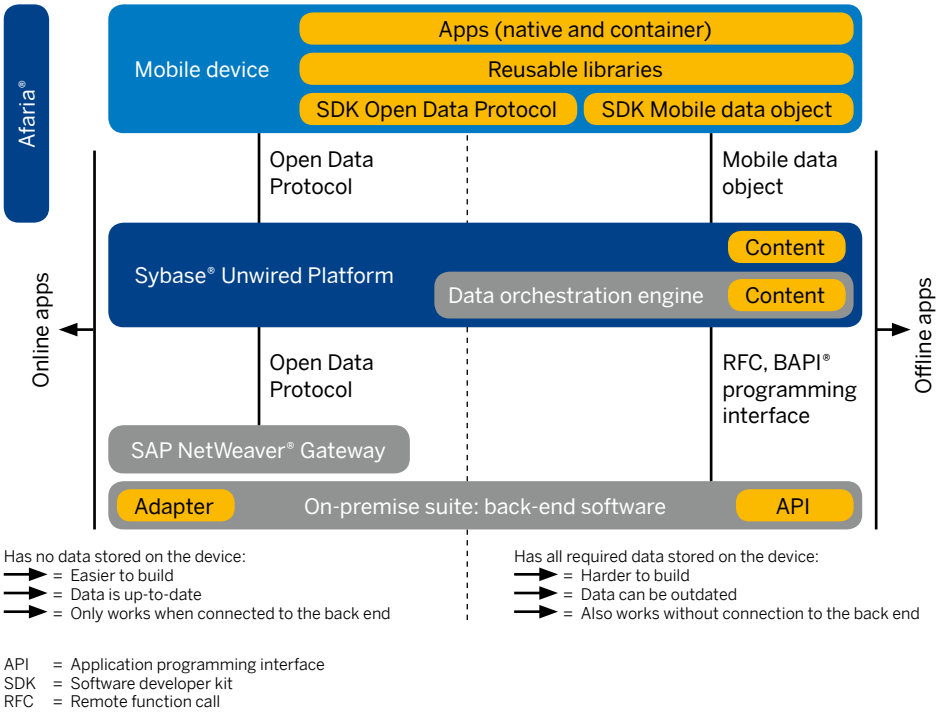
- Since a simple development model is required, applications are developed as add-ons to the back-end SAP software and to the device.
- SAP NetWeaver Gateway technology is the OData provider for the business data coming from SAP Business Suite software.

Offline mobile applications require business processes running on a device in a fully offline mode of operation. Additional features include the following:

- These applications are usually disconnected. When connected, the focus is on synchronizing their data to and from the back-end software.
- Business data is replicated to mobile middleware. Business rules are applied in order to distribute the data to a given device in a predictive manner.
- The mobile middleware keeps track of the data currently on each device in order to compute and prepare its next delta synchronization.
- The platform provides an optimized data messaging protocol to and from the mobile device in order to efficiently transport large data volumes securely and reliably.

For online mobile applications, development is required on the device and may be required on the back-end SAP software.

Figure 5: Sybase® Unwired Platform



A development model is also required on the mobile middleware to define the business data that needs to be replicated and distributed to devices.

SAP BusinessObjects tools are key. Integration of analytical data with the mobile applications is of major importance. Sybase® Unwired Platform, which helps harmonize the different mobile approaches into one mobile platform, is well suited to support mobile analytics solutions. In this paper, however, discussion focuses on its use with mobile productivity applications connected to SAP Business Suite rather than on mobile analytics.

PEOPLE-CENTRIC CONSUMPTION

SAP strives to satisfy the data consumption of 1 billion people by 2015 with functions exposed by SAP software. This calls for applications readily adopted by consumers that comply with enterprise standards for data security, integrity, and consistency. In contrast to business applications, these applications must be productive for consumers at first touch, with no training wanted or offered. A large number of specific, highly focused, consumer-level applications will replace single, feature-rich applications. To realize this, a large community of developers must be at hand to build and deploy consumer-level applications that expose data and functions in a manner the user readily understands and can act on.

SAP offers a mature, comprehensive product portfolio to support these developers. Included is SAP Business Suite software with core business processes and industry solutions; the SAP Business ByDesign™ solution, serving as on-demand

software for small businesses and midsize companies; SAP BusinessObjects tools for on-premise and on-demand deployment of analytic applications; and Sybase Unwired Platform as the enabling mobile platform.

Following a standardized approach specific to people-centric consumption of SAP solutions results in a consistent look, feel, and handling for the products developed. Architectural styles such as REST and standards such as Atom, OpenSearch, and OData provide the core of this strategy.

SAP OFFERINGS FOR ON-DEVICE SOLUTIONS

Sybase Unwired Platform is a mobile enterprise application platform solution that connects mobile workers to business processes at any time, from anywhere. The platform minimizes the complexity of deploying mobile applications, enabling IT to get applications quickly to mobile workers and significantly reducing the total cost of ownership. A comprehensive infrastructure enables IT to rapidly develop innovative applications for task and knowledge workers who need mobile access to enterprise information, helping them respond more productively and efficiently to customer needs.

Sybase Unwired Platform brings the following key benefits:

- **Lower total cost of ownership** – Simplifies and accelerates business process mobilization
- **Increased worker productivity** – Supports faster decision execution on incoming workflows by enabling access from a mobile device
- **Quick reaction to changing business needs** – Accelerates the development and deployment of mobilized business processes by addressing network and data layer requirements, allowing developers to focus on creating a compelling end-user experience
- **Integrated view of mobility** – Provides a single integrated infrastructure designed to support mobilization of your entire enterprise, including enterprise applications, business processes, and device management
- **Competitive differentiation** – Provides employees access to mission-critical applications anywhere and anytime
- **Steady updates as information changes** – Provides steady updates directly from enterprise information resources to end-user devices, with no effort required from the user
- **Reliability and scalability** – Automatically scales and adjusts to changing workloads, supporting high availability of mission-critical business applications
- **Control over end-user devices** – Includes industry-leading support for device security and application management through the Afaria® mobile device management solution, which provides a device-agnostic approach to managing mobility

DEVELOPMENT PLATFORM AND IT MANAGEMENT INFRASTRUCTURE

Sybase Unwired Platform offers two primary features: a development platform and an IT management infrastructure. The development platform delivers connectors to back-end data sources, offers developers an Eclipse-based plug-in, and offers a device software development kit to develop native applications.

The IT management infrastructure offers onboarding of mobile applications, end-to-end security, and a unified console for IT administration and monitoring.

In combination with SAP Solution Manager, Sybase Unwired Platform supports the entire application lifecycle (see Figure 6). This covers everything from initial development of the application and application data using Eclipse tooling to automated deployment, version control, maintenance activities, and decommissioning.

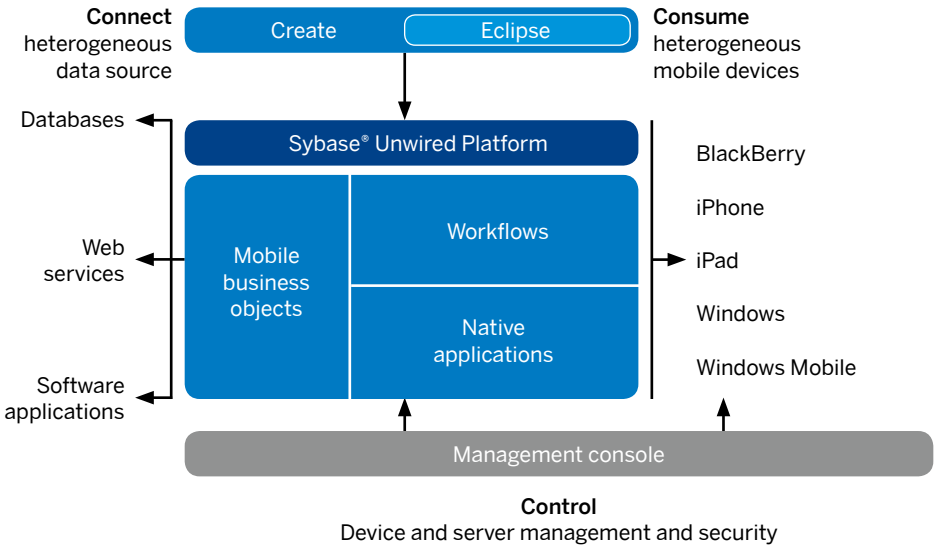
Features of Sybase Unwired Platform

Sybase Unwired Platform delivers:

- A software development kit that supports HTML-based mobile development for all classes of mobile applications running on a variety of mobile devices and technologies, including BlackBerry from Research in Motion Limited, the Android operating system from Open Handset Alliance, Windows Mobile, and iOS-based smartphones and tablets from Apple Inc.
- Android support for container-based mobile applications
- Single-sign-on functionality with X509 certificates
- JavaScript application programming interfaces
- Web-development enablement

Applications can be designed and generated with Eclipse as HTML5/JavaScript /CSS packages. The code generated for these applications conforms to the

Figure 6: Sybase® Unwired Platform – Chaos to Order



applicable standards and can be edited and customized in Sybase Unwired Platform or with any third-party Web development tool, for example, Adobe Dreamweaver.

APPLICATION LIFECYCLE MANAGEMENT FOR MOBILE APPLICATIONS

Above we described how SAP develops and delivers mobile applications that customers can customize and enhance. Infrastructures enabling the development of customer-specific mobile applications was also discussed. In this section, we explain how these approaches fit into the application lifecycle management of SAP for developing, documenting, testing, changing, and deploying mobile applications. To help you operate, maintain, troubleshoot, and monitor your mobile applications efficiently, we introduce the "run SAP like a factory" approach.

In the development scheme supported by SAP Solution Manager, application lifecycle management can be considered as the build phase, while the "run SAP like a factory" approach can be considered as the run phase for mobile applications. There are several areas within SAP Solution Manager for you to use to integrate mobile applications. They are summarized below.

Solution Documentation

All server components – including Sybase Unwired Platform, the relay server of Sybase Unwired Platform, and SAP NetWeaver Gateway – are registered in SAP Solution Manager, which maintains the single source of truth. It contains documentation for the business processes with which mobile applications are integrated and the interfaces exposed by back-end applications utilized by mobile applications.

Software Download

Prepackaged software is provided through the SAP Service Marketplace extranet from SAP Store, allowing entitled users to download mobile applications provided by SAP.

Central Transport and Deployment Management

Typically mobile applications contain mobile client applications, for example, native iOS client applications, as well as dedicated back-end functionality such as back-end calls nested within a gateway plug-in. Depending on the use case, further code segments may be involved. SAP integrates the code segments into the central transport and deployment management functions provided by SAP Solution Manager. This makes it possible to transport and deploy all code segments from development to quality assurance and production within one project. The deployment of mobile client applications to devices is performed by device management software such as Afaria.

Application Incident Management and Remote Accessibility

You will be able to create incident tickets for mobile applications in SAP Solution Manager, handle them internally, or send them to SAP. We provide support for open

incident tickets directly on the mobile device, which is sent to SAP Solution Manager. For secure remote access to server-side components such as Sybase Unwired Platform and its relay server, the existing integration of NetViewer software from NetViewer AG is used. Access to mobile devices can be provided through device management software such as Afaria.

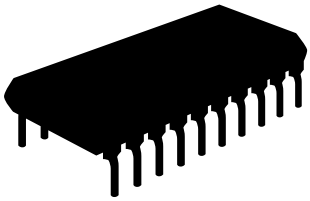
End-to-End Root Cause Analysis
All server components – Sybase Unwired Platform, its relay server, and SAP NetWeaver Gateway – can be included in the root cause analysis performed by SAP Solution Manager. The analysis includes workload, exception, and change analysis as well as database- and host-specific analysis.

Technical Monitoring, Alerts, and Reporting
All server-side components are covered by the system- and application-monitoring functions in SAP Solution Manager. This allows us to utilize the integration for alert processing for incident management and notification management as well. Metrics and events concerning the mobility software are displayed in the system-monitoring software. Dedicated monitoring software covers all necessary components of the mobility software, including back-end software. Reporting on technical key performance indicators for analysis purposes and management reporting as well as management dashboards are provided.

Maintenance Optimization
For SAP software, maintenance optimizer functionality in SAP Solution Manager provides the necessary software components for mobile applications. All dependencies – including mobile client applications, middleware components, and back-end functionality – are taken into consideration.

Service Development
The service portfolio of SAP AGS covers mobile applications and includes as remote services the SAP GoingLive™ Check service, SAP EarlyWatch services, and the SAP EarlyWatch Alert service. SAP MaxAttention™ services cover assessment, optimization, and empowering. Expert-guided implementation services are available specific to the operations of mobile applications. Last but not least, SAP AGS offers a tailored prototyping service to rapidly produce proofs of concept for mobile applications. This service is based on the orchestrated accelerated innovation approach used by SAP MaxAttention services.

With SAP Solution Manager and the support backbone of SAP as a foundation, SAP customers can develop their own mobile applications and manage the operations of those applications. Complementing this approach are the device management functions of Afaria and the management functionality specific to mobile solutions that is part of Sybase Unwired Platform.



In-memory applications are developed and delivered on a memory-based data management layer for transactional business applications and for data warehousing and BI tools. This enables new types of applications that could not be run in the past.

Orchestration of Custom-Built Solutions

Although the well-known recommendation to reduce all custom code to a minimum is still important, SAP acknowledges the need to support custom code to accommodate the software innovation and differentiation you as an SAP customer introduce. In fact, the new technology provides tools and development environments to help you add your own data models, application logic, software components, and coding. The tools and development environments are the same ones used by SAP for standard product development.

In composing and building your own solution, you must observe certain guidelines and standards to achieve cost-efficient implementation, operation, and support of your solution. The following should be kept in mind as you work:

- Suitability of a component to address a specific use case
- Supportability and maintainability
- Quality assurance and change management
- Upgrade and update automation
- Logging and monitoring
- Performance and scalability
- Data consistency and transactional integrity
- Data management
- Backup and recovery

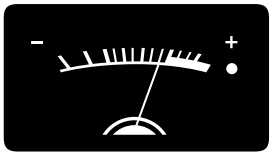
SAP Solution Manager gives you a "new technology" road map to guide you through all phases of building your own innovative solution. The road map includes all required methodologies and support for best practices and comes with specific support services, such as expert-guided implementation. Adhering to these guidelines and standards keeps cost of operations low, protects your investment, and provides a low-risk environment for innovation so you achieve maximum business continuity.

CUSTOMER SOLUTION COMPOSITION

As early as the business blueprint phase, criteria must be observed to help you choose the right solution components for your business processes and specific use case so you compose the optimal solution. This can drastically reduce cost throughout the application lifecycle, minimize the need for customer-specific developments, and reduce total cost of ownership.

You have a multitude of options to shape the mobile architecture for SAP software. Here is a sampling of the different aspects you can determine:

- Client technology operating system: BlackBerry, iPhone, Android, Windows Mobile
- Form factor: phone, tablet, laptop
- System infrastructure
- Network connectivity: WLAN, 3G, BlackBerry
- Back-end connectivity: SAP NetWeaver Gateway, Sybase Unwired Platform
- Device management: Afaria
- Software lifecycle management
- Software development: the SAP NetWeaver Developer Studio tool, Sybase Unwired Platform
- Software deployment: change and transport system software from SAP
- Type of mobility: online/offline, store and forward, device/user/service, internal/external



Any current application that runs with a database supported by SAP software and real-time data replication to SAP HANA can be accelerated.

The following table lists solution design criteria that provide fundamental constraints for composing a well-structured, efficient customer mobile solution.

Requirement	Scenario required	Development recommended	Hardware and Infrastructure
Complex data distribution rules, for example, territory management for sales employees			SAP NetWeaver® Mobile component and data orchestration engine
Over 1,000 mobile devices			Sybase Unwired Platform (clustered)
Access to huge data volumes	Nearly online		
Guaranteed data access, even at places without network access	Offline with data synchronization		
Highly interactive, complex application or high customer demands with respect to user interface or user experience		Native application	
Low development, enhancement, maintenance costs		Web-container	
Professional service staff application users (robust devices)			Devices with Windows Mobile operating system
Complex calculations requiring high computing power			Devices with iOS or Windows Mobile operating system (recommended)
Support for "bring your own device" strategy		Web-container	• Multiplatform support • Device management, for example, Afaria®
Phone integration			iPad as device not an option
Complex screen or reporting			Tablets as device (recommended)

CUSTOM DEVELOPMENT AND CUSTOMER-SPECIFIC CODING

After finalizing the business blueprint and composing a high-level solution design, you can choose to enhance the new technology with your own data models, business logic, and code.

SAP BusinessObjects BI Platform – Modeling and Development

As part of the SAP BusinessObjects BI platform, SAP provides modeling and development environments and tools with which you can create your own business content and coding. They include:

- SAP BusinessObjects BW Universe Builder software for creating the semantic layer that insulates end users from the technical issues of database structure
- The Eclipse environment for Java-based development
- Microsoft Visual C++ to develop Windows applications
- SAP BusinessObjects Dashboards software to design dashboards

The following table gives an overview of the software development kits supported by the SAP BusinessObjects BI platform.

	Software Developer Kits (SDK)			
Product	**Java**	**.NET**	**Component Object Model/Active Server Page**	**Adobe Flex**
SAP® BusinessObjects™ Business Intelligence platform, SAP BusinessObjects solutions, SAP Crystal server	Enterprise SDK, Report application server (RAS) SDK, Web services SDK	Enterprise SDK, RAS SDK, Web services SDK	Enterprise SDK	
SAP BusinessObjects Web Intelligence®, SAP BusinessObjects Desktop Intelligence™	Report engine (REBEAN) SDK	Report engine (RENET) SDK	Desktop intelligence SDK	
SAP Crystal Reports®	Java reporting component (JRC) SDK		Report designer component (RDC) SDK	
SAP Dashboard Design 2008 and later				Flex SDK

The SAP HANA studio – Modeling and Development

Using the SAP HANA studio, you can:

- Specify which tables are stored in the SAP HANA database
- Manage SAP BusinessObjects Data Services software to load data from SAP NetWeaver BW and third-party software
- Manage connections to instances of SAP ERP
- Use SAP BusinessObjects Data Services for your modeling work
- Perform modeling in the SAP HANA studio independent of SAP BusinessObjects Data Services
- Perform modeling in SAP BusinessObjects BW Universe Builder by joining fact and dimensional tables

With the software developer kit for modeling within the SAP HANA studio, you can develop analytic applications powered by SAP HANA.

Mobility Software – Development

The software for developing mobile applications contains all the high-level components you need for developing, deploying, and operating mobile applications. The software includes a set of mobile client technologies – software development kits and reusable libraries – along with design tools with which you can create attractive mobile applications to run on all types of devices.

SAP NetWeaver Gateway

SAP NetWeaver Gateway technology is a development framework available as an ABAP™ programming language add-on for the SAP NetWeaver Application Server component. The add-on can be installed on top of existing SAP Business Suite software or on an application platform.

SAP NetWeaver Gateway connects the data and functions of SAP Business Suite software with target clients, platforms, and the programming framework. It offers service generation tools that

let you reuse existing models to create consumption models, which drastically shortens development time. It includes the following tools:

- Object-based generator – Connects to a business object repository to generate consumption models based on existing business objects
- Screen-based generator – Connects to a screen model to generate consumption models based on screens created in the Web Dynpro development environment

Neither tool requires coding. Both allow you to reuse existing business objects and screens. Both have data adaptation features that require no coding. Data coming from multiple objects can be aggregated, filtered, and adapted based on client application requirements. Both tools generate structures that can be enhanced using programming tools.

An additional tool provided by SAP NetWeaver Gateway for developing consumption model structures requires ABAP coding skills.

Data Orchestration Engine

The data orchestration engine is an integral part of SAP's mobile application development software. It enables users of occasionally connected mobile devices to view information pertaining to their daily activities and forms a link between the client application and the back-end and business layers. It performs data consolidation and data distribution: it captures all the changes pertaining to the various business processes relevant for distribution and correlates and distributes them to the various offline devices connected to it. Back-end adapters enable the data orchestration engine to establish loosely coupled connections to the source enterprise information software. To communicate with the corresponding back-end adapter of the data orchestration engine, the enterprise information software must expose its business data by implementing a set of services.

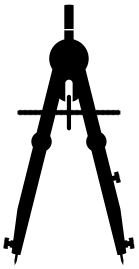
In the case of SAP Business Suite software, these services are implemented as ABAP function modules using the BAPI® programming interface and are known as BAPI wrappers. Enabled by remote function calls, BAPI wrappers can retrieve and update multiple data sets simultaneously. The data orchestration engine uses them to retrieve business data from the back-end software and to send data updates performed on the mobile client to the back-end software. Back-end adapters provide functionality to map data from the source enterprise information software to the data representations of the data orchestration engine.

When the enterprise information back-end software is not SAP software, the data orchestration engine can connect through Web services or SAP NetWeaver Process Integration technology to leverage its adapter features. Custom services, similar semantically to the BAPI wrappers, can be developed for each of the other enterprise information software systems.

Sybase Unwired Platform – Development Platform

Sybase Unwired Platform offers a development platform that delivers connectors to back-end data sources, offers developers

SAP NetWeaver BW, powered by SAP HANA, is an integrated engine for data management and in-memory processing for analytical purposes, which requires no reimplementation.



an Eclipse-based plug-in, and provides a device software development kit to develop native applications. Two major development tools are a mobile workflow forms designer and a workspace within Sybase Unwired Platform.

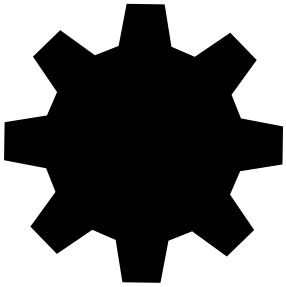
Using the mobile workflow forms designer, architects can design mobile workflows and business processes quickly using a hybrid Web container technology. This technology supports HTML-based mobile development for iOS, BlackBerry, and Windows Mobile devices; Android support for container-based mobile applications; and single-sign-on functionality with X509 certificates. The code generated for the applications conforms with the applicable standards and can be edited and customized with Eclipse in Sybase Unwired Platform or with any third-party Web development tool.

The workspace of Sybase Unwired Platform is a graphical environment for developing data aspects of mobile applications using mobile business objects. Mobile business objects encapsulate business process logic and data in a reusable unit. Developing a mobile business object involves defining an object data model with back-end enterprise information software connections, attributes, operations, and relationships that allow filtered data sets to be synchronized to the mobile device. Developing mobile business objects is performed in Sybase Unwired Platform in Eclipse.

LEARN MORE

To learn more about how you can leverage orchestrated accelerated innovation to create reliable, secure mobile applications that support your mission-critical business processes at a low cost of total ownership, visit us at www.service.sap.com/maxattention.

A potential deployment for SAP HANA within an SAP solution landscape demonstrates the value of next-generation BI software. The solution landscape could consist of SAP ERP, SAP NetWeaver BW, and the SAP BusinessObjects BI platform.



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