Innovation From the Ground Up
The Next Generation of Enterprise Business Solutions
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Introduction
What if you had the chance to build an enterprise business management solution from scratch, using the best technology and all the available knowledge of today? At Workday we have that opportunity. This paper describes—in three steps—the approach we are taking to create the next generation of enterprise business solutions “from the ground up.”

SaaS at a Glance:
The increasing interest and adoption of software-as-a-service (SaaS) is due to the long list of benefits it brings (both for customers and vendors) as a solution model.

- Pay as you go subscription model vs. “shelf-ware-including” license model
- No server hardware costs or hardware maintenance fees
- No server software licenses or software maintenance fees
- No application maintenance fees
- No upgrade fees
- No hardware installation
- No software installation
- Implementation starts as soon as the contract is signed
- Reduced “vendor lock-in.” Because startup costs are minimised, the customer’s ability to switch solutions is enhanced over on-premise implementations
- Most efficient model for application maintenance and upgrade delivery
- Most efficient model for collaborative development with customers
Step 1: Start With SaaS

For many reasons software-as-a-service (SaaS) is the model of choice for contemporary business applications. The main benefit of SaaS for both the vendor and the customer can be summarised in one word—control.

In traditional on-premise approaches, software vendors faced huge variability in the technology stack. Customers wanted support for specific hardware, operating systems, and databases. The time and cost of upgrades led many organisations to delay them, leaving many customers far behind current versions. The requirements for multiple versions and corresponding support resulted in significant cost to the vendor, which was passed on to the customer in the form of license and maintenance fees.

On-demand applications give the vendor the ability to control variability in the technology stack. It eliminates the issue of one segment of customers being on version N of vendor Y’s database while another segment is on N+1 and another segment uses vendor Z’s database. Having all customers on the same environment allows the vendor to optimise the delivery of support and maintenance:

- The support organisation no longer has to verify and re-create the customer’s environment since that environment is known and the same for all customers.

- Performance issues, which used to require 20 questions (at least!) about the customer’s environment, can now be monitored, managed and solved by the vendor—in many cases without any customer involvement.

- Quality assurance can focus on a single version and stack, rather than verifying each and every possible customer combination.

An even bigger control advantage comes from the fact that SaaS vendors apply all updates and perform all upgrades. Instead of spending time and resources on packaging updates, training customers on upgrades, or dealing with the inevitable support requirements, vendor staff can focus on performing these processes one way for all customers.

Finally, hosting the customers’ applications gives the vendor control over enhancing those applications over time. Solutions that operate on-premise in the customer’s data center may include unique integrations or code-level customisation. Even if the on-premise solutions include a services layer for integration, customers have the ability to go around it to directly access the logic and data of the application in other ways. A simple rule to remember is that if they have the ability, be assured they will exercise the ability.

With on-premise deployments, customers can integrate to solutions anywhere in the stack. While this may create some short-term benefit, it typically creates major problems over the long term for both the customer and the software vendor. A common scenario involves a customer creating a custom integration directly to the solution database. The problem in this situation is that any subsequent changes or upgrades to the database by the vendor will be very difficult (if not impossible) for the customer to take because they will break the database-level integration. With the SaaS approach, vendors can ensure that integration and access are through standard, public APIs. This significantly improves the solution provider’s ability to enhance the internals of the application on a regular basis, delivering continuous innovation without breaking customer integrations.

The cost of ownership advantages of SaaS are much talked about. The additional control that vendors get from SaaS is at least as valuable, since that control dramatically enhances the quality of service, support and new functionality delivered to customers. SaaS is not just about cost reduction.
Step 2: Use a Modern Application Development Framework

Application development frameworks help productivity by automating or hiding certain low-level tasks in application development. Frameworks developed in the client-server era helped to automate the creation of relational database tables and graphical user interface forms from metadata created in the framework. More modern frameworks (everything from Java Enterprise Edition to Ruby on Rails) seek the same productivity gains in different ways:

- While client-server frameworks often support multiple database platforms, newer frameworks add support for multiple Web server platforms and feature support for open source solutions at both the database and Web server level.

- Client-server frameworks helped developers by generating the SQL conversation between the application and the database. Modern frameworks go several steps further in encapsulating access to data by hiding SQL altogether. Developers expose relational tables as classes. Updates to data and requests for data are exposed as methods.

- Client-server frameworks facilitated the creation of the application’s user interface (UI) but the UIs created by these frameworks are closely tied to the application logic. Newer frameworks feature more separation between presentation logic and application logic. This looser coupling allows the “viewer” technology for an application to change without forcing change in the application logic.

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**Figure 1: Workday Technical Architecture**
While there are many generic (built for creating any type of solution) development frameworks available in both traditional and open source forms, these frameworks lack considerable functional capability that is required for building enterprise applications. In contrast, the Workday development framework is purpose-built from the ground up for creating enterprise business solutions, going far beyond what generic frameworks offer, providing built-in support for:

- Creation of multi-tenant applications;
- Definitional development of applications to support efficient upgrades;
- Configurable workflow process definition, execution and measurement;
- Dynamic role assignment;
- Automatic generation of Web services from application data elements; and
- Audit of application level changes.

Workday embraces the approach modern frameworks are taking to leverage open source technology, support object-oriented modeling of logic (over relational modeling) and separate presentation logic from application logic. Workday’s framework extends this approach to meet additional needs of the enterprise business services developer.

Workday’s business services are built on a modern application framework. The three main components of the framework are the Object Management Server (OMS), the User Interface (UI) Server and Integration Network. Each of these components leverages open source technology.

- The OMS works on the concept of presenting the application as an object model (made up of classes and methods). The OMS extends this concept by removing the need for any relational mapping (or wrapping of relational tables). The persistence layer in the OMS is an unchanging relational structure, which is able to reliably persist transactions to the application data and metadata. Application developers do not need to understand the structure of this database and they do not need to manage changes to the structure of the database when they change the structure of their object model. This dramatically increases developer productivity as they go through the iterative process of developing, testing, enhancing, testing and so on.

- The UI Server is completely separate from the OMS. It receives XML from the OMS describing the data to be presented. From this XML it is able to generate the presentation and presentation logic of the Workday UI.

- The Integration Network includes a complete Enterprise Service Bus (ESB) to provide transformation, orchestration (via BPEL) and reliable delivery of Web services generated out of the OMS. This technology supports the packaged integrations which are part of Workday’s Integration Network and facilitates integration of Workday to the wide variety of third-party systems most enterprise customers have.
Step 3: Model the Business Not the Data

Current ERP applications were originally designed to deliver regulatory HCM reports and required financial statements. Developers of these applications focused on designing data models that could produce the required output and then focused on building the transactions to feed the data models.

Some flexibility was built in (such as extensible chart fields in Financials), but the end result was still transaction systems that were good at one kind of reporting but essentially useless for other reporting requirements (such as management reporting).

Workday is taking a different approach. Our developers start by modeling the business (its people, organisations, locations, cost centers, ad hoc networks, etc.). Then we capture all the information surrounding meaningful events that happen in the business (hires, purchases, payments, reorganisations, etc.). When it is time to produce reports, Workday is able to use the event information to derive the required HCM, Payroll and Financial reports as effectively as current ERP systems.

And because Workday doesn’t strip away potentially useful information, we are able to produce other meaningful reports about the business for managers and workers across the organisation—not just the HR or accounting and finance teams. And Workday does this without requiring customisation to build management reports in Excel or third-party business intelligence solutions. Workday generates these reports for you.

Summary

Application development architectures are changing rapidly to leverage the internet, new technologies and innovative approaches in software engineering. These changes are increasing developer productivity, speeding application deployment and enabling greater application interoperability. Established ERP vendors are blocked from fully realising the benefits of the new approach because it calls for replacing the on-premise delivery model, the code-based, heavy relational frameworks and static data model-based solutions they’ve been selling for the past 20 years. Innovation in ERP will be revolutionary not evolutionary. Workday sees an opportunity to deliver revolutionary improvements at all levels of application development. Workday is capturing this opportunity by embracing innovation from the ground up.

About Workday

Workday is the leader in enterprise-class, software-as-a-service (SaaS) solutions for managing global businesses, combining the lower cost of SaaS with a modern approach to applications. Founded by PeopleSoft veterans Dave Duffield and Aneel Bhusri, Workday delivers Human Resources, Financial Management and Payroll solutions for midsize and Fortune 500 companies. Workday’s next generation system of record leverages standards-based integration and provides a new enterprise foundation for global companies. Workday’s innovative thinking, new technologies and SaaS solutions provide a fresh alternative to legacy, on-premise ERP. More than 130 customers have selected Workday. Visit us at www.workday.com.