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# Schneider National Implements Next - Generation IT Infrastructure



## Introduction

Schneider National, Inc., a leading provider of truckload, logistics, and intermodal services, serves more than two-thirds of the FORTUNE 500 companies. Its customers rely on Schneider National's transportation and logistics solutions to transport their products reliably, cost-effectively, and safely.

Schneider's growth and leadership in the trucking industry was powered by a strong information technology organization that custom developed and maintained the core applications enabling Schneider's operations. As was typical with most IT organizations over the last two decades, applications were developed in the best available technology platforms leading to a very diverse set of applications running on a variety of technology stacks (hardware, operating systems, and middleware). Schneider's applications and data environments had also grown complex. Maintaining and evolving the applications and the application to application integrations was expensive and time-consuming, data was siloed and several important business processes remained labor intensive.

The quote-to-cash process involved multiple order entry systems, multiple transportation rating engines, several sources of customer information, multiple repositories for enterprise data and hundreds of reports. Despite the wealth of data being collected, Schneider did not have a "single version of the truth" and an integrated automated quote-to-cash process, both key to driving competitive advantage in the highly competitive trucking industry. Schneider realized that it had to rationalize, simplify, modernize its enterprise IT applications and infrastructure. It had to transition to an IT environment that was modular, flexible, expandable, and scalable, an IT architecture that could support the company's long-term strategic growth.

In response, the Schneider executive team decided to launch a five-year business transformation program that would enable the company to meet its strategic goals for the next decade, give it a clear competitive advantage, and ensure its leadership position in the transportation and logistics industry.

The enterprise transformation initiative—known as Quest—encompassed reengineered processes and a next-generation IT platform that would enable Schneider to make informed decisions at every level of the enterprise, drive profitability, and reduce costs across all divisions. The company looked to Oracle as its technology partner for the enterprise-wide initiative, implementing Oracle E-Business Suite, Oracle's Siebel Customer Relationship Management (CRM) applications, Oracle Transportation Management, Oracle Fusion Middleware components, Oracle Database, Oracle Enterprise Linux, and Oracle Enterprise Manager.

With the Quest program, Schneider has transitioned from a tradition of building applications in-house to a hybrid approach where Schneider uses commercially available best-of-breed industry applications for key back-office, front-office, and operational functions and custom applications for critical capabilities that offer a competitive advantage. Schneider decided to build its custom applications using Oracle technologies. Standardizing on the Oracle technology stack (database, application servers, and development tools) has simplified the development, testing, and deployment process, reduced overall IT costs, improved quality, and enhanced enterprise productivity. Schneider has established deep competency across Oracle products that have greatly improved IT throughput and quality allowing Schneider's IT organization to respond quickly to new business requirements.

This case study provides an overview of Schneider’s technology transformation. It showcases how Schneider is:

- enhancing the web experience for drivers, customers, and service providers
- personalizing portals and securing access to applications
- developing high performance custom applications
- streamlining storage and access to content
- connecting key business processes and automating workflows
- driving improvements in development productivity and infrastructure costs
- centralizing operational data and simplifying access to data
- monitoring the software infrastructure

Schneider is well positioned to achieve its long-term strategic objectives with the enterprise IT transformation it has achieved through the Quest program.

### Current Enterprise Technology Architecture

The figure below shows Schneider’s current enterprise technology architecture. The architecture was developed around three core tenets: a common development environment, a common runtime environment, and a common management environment so Schneider could standardize processes and tools across the BUILD, RUN, MANAGE lifecycle.

The application layer in the architecture consists of Oracle enterprise applications: Siebel CRM, Oracle E-Business Suite, Oracle Transportation Management, custom applications developed by Schneider using Oracle’s Application Development Framework, reporting modules, and third-party applications.

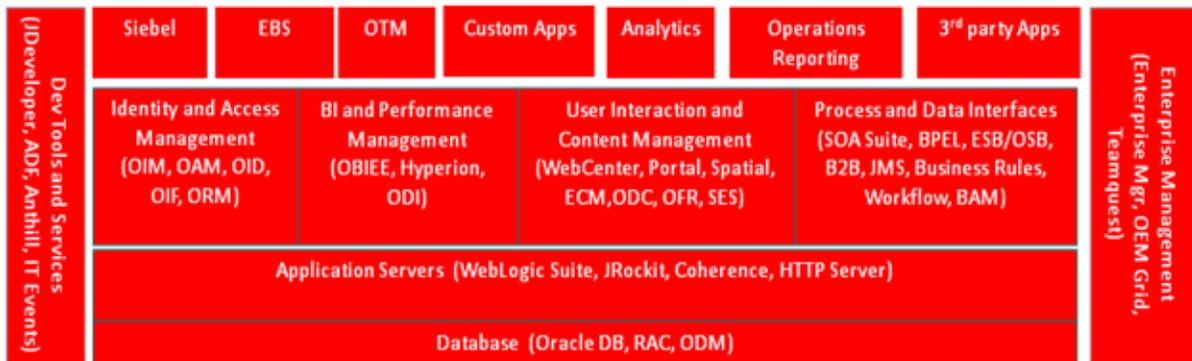


Figure 1. Schneider’s current enterprise technology architecture

Schneider leveraged Oracle Fusion Middleware to provide a strong enterprise foundation for (a) secure access to enterprise applications, (b) portals and enterprise content management, (c) common enterprise SOA services, business rules, workflow management, (d) internal and external integration, (e) custom developed applications, and (f) analytics and operational reporting.

### **Common Build Environment**

Schneider adopted a common toolset to develop applications, re-usable components and enterprise web services. Schneider uses JDeveloper which integrates development needs for Java, SOA, XML, and Web 2.0 components in a single development environment. JDeveloper is also the development environment for Oracle's Application Development Framework (ADF). Built on the Enterprise Java platform, Oracle ADF provides a comprehensive framework of objects for developing web and mobile applications. Standardizing the Build environment has helped Schneider streamline the development process, improving productivity, quality, and software re-use.

### **Common Runtime Environment**

Oracle's WebLogic Suite (part of Oracle Fusion Middleware) anchors a common run-time environment for applications and the foundation/common services layer. Deployed on Oracle Enterprise Linux, the WebLogic suite provides a high performance, scalable run-time environment. Schneider also leverages Oracle Coherence to create a high performance in-memory data grid for its computationally intensive high performance applications.

### **Common Management Environment**

Schneider standardized the management environment for Oracle applications and technologies with Oracle Enterprise Manager. With Oracle Enterprise Manager, Schneider can support Oracle Databases, WebLogic Servers, Coherence, and Oracle Applications. Enterprise Manager provides end-end monitoring and management across these components.

By standardizing on Oracle Fusion Middleware and the tools, processes, and environments used across the technology lifecycle, Schneider has put in place a strong platform for growth and innovation.

### **Enhancing the Web Experience for Drivers, Customers, and Service Providers**

Schneider's portals for drivers, service providers, and customers were very static, expensive to maintain, and needed IT involvement to update most content. The business wanted a more dynamic and less IT-centric solution that would allow it to modify portals and content quickly and easily, improve collaboration with users, and achieve integrated solution across various types of content, applications, and collaboration services. Schneider used Oracle WebCenter Portal and WebCenter Content to achieve these goals across its driver, customer, and service provider portals.

The driver solution relies heavily on core Oracle WebCenter Portal services, such as announcements, discussions, events, and documents, to communicate and collaborate with drivers. Forms and polls created in Oracle WebCenter Content and embedded within Oracle WebCenter Portal pages are also important parts of the solution.

Schneider has different types of drivers. Each driver type has a separate group space that is maintained by a business leader, who makes changes and updates the content without IT involvement.

Drivers can quickly, view online training, and check their pay statements using the new solution, which has single sign-on integration to Oracle E-Business Suite, Oracle Learning

Management, and ADP payroll services. In addition, Schneider embedded Oracle Business Intelligence dashboards in Oracle WebCenter Portal pages, allowing drivers to see their pay trends and other analytical information without having to sign in multiple times. Schneider's more than 12,000 drivers can access the portal from their in-cab Qualcomm device as well as from any internet browser.

The company's customer and service provider portals are also built on Oracle Fusion Middleware and development components. Customers and service providers register for access through Schneider's main Web site, [www.schneider.com](http://www.schneider.com). The Web site has an Oracle Application Development Framework application that walks them through the registration process and submits a request to Schneider's onboarding team via a service-oriented-architecture (SOA) workflow. The solution provisions customers and service providers for their appropriate roles and sends them an e-mail with their user identification and password. At that point, they can log into the system quickly and easily.

Once logged in, customers and service providers see a custom home page specific to their roles. The page contains Oracle WebCenter Content material, as well as views into Oracle WebCenter Portal documents, announcements, and events. Schneider can change and modify these pages as needed. It also has Oracle ADF applications embedded into the portal that bring together content, reports, and services to support order tracking and rate quotes.

### Personalizing Portals and Securing Access to Applications

Driving the personalized Web experience for employees, partners, and customers and ensuring secure access to the content on the driver, customer, and service provider portals is Oracle's Identity and Access Management suite, part of Oracle's Fusion Middleware platform.

Managing secure access to enterprise applications and data has become particularly difficult for all enterprises with the growth in the number of applications, the number of data repositories and the growth in the number and types of users (customers, employees, and partners) needing access to applications and data.

Prior to the Quest program, Schneider managed access provisioning with a home grown application. This application was very resource intensive, needing significant involvement from IT to manage provisioning. It had reached its limits and could no longer provide the level of security and compliance Schneider needed. The on-boarding process at Schneider also relied on manual requests and manual provisioning. Ensuring that each user had the right level of access required multiple iterations and adjustments. There was no central repository for user profiles, so it was difficult for Schneider to map user access to applications.

Oracle's Identity and Access Management suite (Oracle Identity Manager, Oracle Role Manager, and Oracle Access Manager) and Oracle WebCenter have helped Schneider transform provisioning, personalize the user experience, and ensure compliance with financial regulations and IT security policy at Schneider. User profiles are stored in the E-Business Suite Human Resources Management system (HRMS). This data is sent by Oracle Identity Manager to Oracle Role Manager which enables business users to define user access to various applications. Oracle Identity Manager uses the role and role grant information provided by Oracle Role Manager to provision access to various applications, automates IT processes, and enforces security and compliance requirements.

Oracle Identity Manager monitors updates to E-Business Suite's HRMS and appropriately provisions users in Siebel CRM, Oracle Transportation Management, and other enterprise applications. Out-of-the-box integration of the various components in the Identity and Access Management suite helped Schneider save on development costs and reduced the time needed to implement the solution.

### Streamlining Storage and Access to Content

Content management is a huge challenge for all enterprises, big and small, because of the VOLUME, VARIETY, and VELOCITY of content enterprises need to manage today. The Schneider architecture team considered the following architectural tenets as they identified the tools and finalized the content management architecture. The architectural tenets included: (a) facilitating dynamic updates to internal and external portals, (b) providing business users the ability to manage, update content directly through Oracle WebCenter, and (c) adopting a single platform to store and manage documents, and digital content across internal and external portals.

Oracle's WebCenter suite supported all of these architectural tenets and was Schneider's choice for digital content and document management. Enterprise Content Management, part of the WebCenter provides a centralized enterprise platform for storing, indexing, and retrieving documents. Content for internal portals such as newsletters, and training materials and content for external websites, such as Schneider.com are stored in Oracle WebCenter Content. Shipment and driver documents that are digitized using tools such as Oracle Forms Recognition, and Oracle Document Capture are also stored in Oracle WebCenter Content.

Adopting a single repository to manage content and empowering business users to manage content has allowed Schneider to keep its portals dynamic and fresh with the latest content, streamline management of driver and shipment documents, and improve productivity.

### Centralizing Operational Data and Simplifying Data Interfaces

To ensure there is a "single version of the truth", provide visibility to operational data and KPIs, Schneider setup an Operational Data Store (ODS) that is used to drive operational reporting. The ODS is integrated with Schneider's operational applications using Oracle Data Integrator (ODI). ODI provides a single application to extract, transform, load, schedule, and monitor data feeds. Schneider uses Oracle Business Intelligence Enterprise Edition (OBIEE) to drive operational reporting. Schneider shares performance reports with service providers and customers through the Customer and Service Provider portal.

Schneider's business users can use OBIEE tools to manage reports provided to stakeholders, expediting reporting, minimizing IT involvement and consequently the cost and effort required for operational reporting. OBIEE also provides powerful analytics tools, allowing Schneider to drive operational improvements through insights gained from the data.

### Developing High Performance Custom Applications

Prior to Quest, Schneider had a complex applications environment that included a number of PC, UNIX, and mainframe-based custom applications developed in a variety of tools and decision support applications that ran on the mainframe. With Quest, Schneider has greatly simplified its application environment through Siebel CRM, OTM, and E-Business Suite HCM

and Financials. However, Schneider still needed “custom applications” that complemented the Oracle suite. They included applications for pricing, and capacity management with complex mathematical models that maximized profitability, driver, and asset utilization.

Schneider has built custom applications on Oracle Applications Development Framework (ADF), part of Fusion Middleware. Oracle ADF allowed Schneider the flexibility to use their preferred platforms while ensuring that the applications could scale and deliver the performance needed. Adopting a single tool-set, adopting ADF and SOA-based applications development, Schneider was able to drive component-based development, re-use of existing components, and the evolution of a library of enterprise components and services. Schneider also leverages the testing tools available in JDeveloper to ease functional testing of its custom applications.

Schneider has greatly improved productivity in its applications and infrastructure teams and has reduced the complexity in development and maintenance of its custom applications.

### Connecting Key Business Processes by Integrating Applications & Automating Workflows

The Quest program is a compelling integration story, as Schneider linked Siebel CRM applications, Oracle Transportation Management, Oracle E-Business Suite, as well as Schneider-built and third-party applications. Schneider also standardized the integration with its external trading partners.

Prior to using Oracle SOA Suite, Schneider used a variety of tools for integration, including Sterling’s GENTRAN and GIS, IBM’s WICS, home grown Java ESB and IBM’s MQ Series.. Given Schneider’s strategic alignment with Oracle for the technology platform, it made sense to leverage Oracle products for integration. Oracle SOA Suite enabled Schneider to consolidate on a core set of tools, providing a consistent programming model for our developers, as well as lower development and maintenance costs.

Oracle’s SOA suite allows Schneider to automate enterprise processes that include human workflows and application-application interactions. Schneider used well defined integration patterns to design and implement all interfaces. The Quest program involved the development of over 200 integrations. To enable centralized access to key data entities and facilitate re-use of data access services, Schneider created enterprise web services such as TransportationOrder, Claims, Shipment, Account, AccountProfile, Location, Driver, and Supplier. These enterprise services have enabled re-use and consistency in the development of integrations.

As part of the integration process, Schneider built 200 BPEL processes that generate 50 million composite instances per day across five SOA Suite clusters in 11g and 200 BPEL processes that generate 10 million composite instances across three SOA Suite clusters in 10g. About 40 business rules enable Schneider to tune data flows in real time. The workflows orchestrated through BPEL processes include human workflow as well, where human intervention is used to deal with exceptions. Many of the workflows require sequential processing of messages. Schneider’s development team worked with Oracle to address this challenge and find a creative solution to order messages in JMS queues. There are 80 WebLogic JMS queues that process over 20 million messages per day.

For integration with trading partners, Schneider uses Oracle B2B for EDI, which is part of Oracle's SOA Suite. Oracle B2B for EDI provides secure reliable exchange of documents with trading partners in a variety of formats including ANSI X.12, UN/EDIFACT, and RosettaNet. With Oracle B2B for EDI, Schneider has a centralized platform to manage documents, trading partners, and document exchange transactions. Schneider uses both Oracle B2B for EDI 10g and 11g for its trading partner communications. The 10g B2B server processes 42000 messages per day with 700 trading partners involving over 100 types of documents. The 11g B2B server processes 130,000 messages per day with 225 trading partners and handles over 30 different types of documents.

Schneider has established a Center of Excellence in its IT organization to drive continued use of best practices in design and implementation of SOA architecture across all projects.

### Supporting High Transaction Volumes

Being a large transportation company, Schneider has very high transaction volumes, particularly in the area of transportation planning and execution. To ensure that it could meet its performance and scalability requirements, Schneider offloaded as much of the triggering/change detection workload from the applications as possible.

A prime example is the approach Schneider used to handle real-time shipment updates across many of its packaged, custom-built, and third-party external applications. Schneider used Oracle Data Integrator and Oracle SOA Suite to develop the Shipment Hub which serves as the central communication hub for shipment data. With the Shipment Hub, Schneider can now manage and publish more than 500,000 shipment inserts/updates/deletes daily, consolidate updates to a single shipment into a single event, deliver events to a wide variety of end-point technologies, and ensure latency requirements of less than one minute. This solution framework also can publish shipment events to additional end-points dynamically without requiring code changes.

Schneider also uses Oracle Coherence to support the extreme computational requirements for its transportation optimization applications. The ability to store objects in memory allows these applications to scale and support the high transaction volumes at Schneider.

### Monitoring the Software Infrastructure with Oracle Enterprise Manager

Effective monitoring of applications, infrastructure software and hardware is critical to ensure high availability for the Oracle suite, custom and third party applications in Schneider's IT environment. Using specialized applications to monitor and manage each device or application greatly increases the cost and complexity of monitoring and support. Schneider chose an enterprise tool, Oracle Enterprise Manager, to manage its software and hardware.

With Oracle Enterprise Manager, Schneider has a strategic tool to manage the databases, middleware, and applications in its environment. This has simplified ongoing maintenance of the environments, and helped ensure high availability.

## Summary

The Quest program has transformed Schneider's IT environment and has enabled a complete enterprise transformation of the Quote-to-Cash process which included key functions ranging from quote and order management to transportation planning, fleet operations, human resource management, and financial management. What is unique about Schneider's IT transformation is its extensive use of all the major components of Oracle Fusion Middleware ranging from applications development to the SOA suite, content management, identity management, and business intelligence. By standardizing on Oracle, Schneider has simplified its applications design, development, and maintenance, improved productivity, enabled component re-use, and put in place an open-systems based infrastructure that can provide Schneider with the scalability, performance, and reliability it needs to power its growth in the next decade.



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