Oracle JD Edwards EnterpriseOne

In-Memory Portfolio Management on the Oracle SuperCluster M6-32

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Executive Summary

Executive insight into the real time status of the state of the business requires the summarization of a wide variety of financial information and potentially the combination of tens of thousands of tasks for hundreds of individual projects. In order to understand and gain insight into budgets, actual costs, estimate to complete, earned value and profitability of their business at any point in time, executives need to summarize project information in many different ways. Project managers and executives perform a series of analyses including earned value analysis and other industry and company-specific methodologies. Results of this analysis that are out of a specified tolerance need to be drilled down on to pinpoint the root cause and take effective action.

The JD Edwards In-Memory Project Portfolio Management solution is part of Oracle Engineered Systems, where the hardware and value added features of Oracle SuperCluster M6-32 with the application layers of JD Edwards EnterpriseOne provide unprecedented speed to gather, aggregate, and summarize real time project information.

The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution when deployed on Oracle's engineered system, the Oracle SuperCluster M6-32, provides near real-time executive level visibility into project portfolio cost and profitability that has never been possible until now.

JD Edwards EnterpriseOne In-Memory Project Portfolio Management helps executives and project managers make quicker, more informed decisions about their portfolio and projects.

For more information on JD Edwards EnterpriseOne and Oracle Engineered Systems please see the Benefits of Running JD Edwards EnterpriseOne on Oracle Engineered Systems white paper.

Introduction

Executives and business managers need to know the state of the business at any time of the day or night. In today's economy, organizations are looking for a competitive advantage and are finding ways to do more with less in the same timeframes to improve their bottom line. Efficiency in all aspects of the organization is extremely important. This spans everything from staffing and facilities to manufacturing and logistics. Global businesses must be able to operate across all time zones. The CFO in London should not have to wait for the ERP system in China to finish processing before viewing current information. Access to the most current and accurate information is vital for business managers to make timely and well informed decisions. Business processes along with IT and ERP systems must be optimized to support the organization's goals rather than causing a bottleneck. To that end organizations seek to respond rapidly with instant updates to critical project related data. It in in this way that organizations become more agile, responding rapidly and moving quickly with effective decision making and project management of multiple projects in order to understand quickly the state of the business in the moment.

Managing a single complex project is a challenge for any project manager. The task of managing a portfolio of projects for project executives is even more challenging and it is essential for them to be able to understand and assess the state of their business at any point in time. The need goes well beyond making sure projects complete on time and on budget. Ultimately, for companies to thrive, the project portfolio needs to be profitable. In order to achieve this, executives need to have their finger on the pulse of numerous project data elements such as budgets, actuals, forecasts, open commitments, invoices, and cash received.

The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution is part of Oracle Engineered Systems, which combines the hardware of Oracle SuperCluster M6-32 with the application layers of JD Edwards EnterpriseOne and provides unprecedented speed to gather, aggregate, and summarize real time project information. The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution provides new executive level visibility into project portfolio cost and profitability.

This white paper will explore the benefits of the JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution as deployed on the Oracle SPARC SuperCluster M6-32and point out new and automated features to help project managers and executives make quicker, more informed decisions about their portfolio and projects.

Introduction to the Oracle SPARC SuperCluster M6-32

Oracle SuperCluster M6-32 is a multi-purpose engineered system that has been designed, tested, and integrated to run mission-critical enterprise applications such as JD Edwards EntepriseOne In-Memory Portfolio Management and rapidly deploy cloud services while delivering extreme efficiency, cost savings, and performance. It is well suited for JD Edwards EntepriseOne In-Memory Portfolio Management because it supports multitier enterprise applications with web, database, and application components. This versatility, along with powerful, bundled virtualization capabilities, also makes it an

ideal platform on which to consolidate large numbers of applications, databases, and middleware workloads, or to deploy complex, multiuser development, test, and deployment environments.

It combines highly available and scalable technologies, such as optional Oracle Database 12c and 11g Oracle Real Application Clusters (Oracle RAC) and optional Oracle Solaris Cluster software with industry-standard hardware. Its architecture enables a high degree of isolation between concurrently deployed applications, which may have varied security, reliability, and performance requirements. SuperCluster M6-32 also provides hardware isolation between groupings of CPU, memory, and I/O for higher availability within the node.
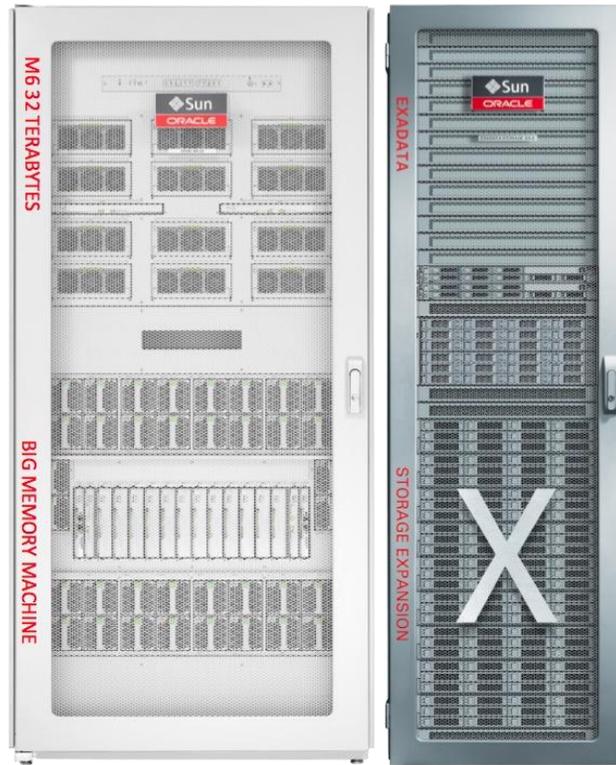

Figure 1. The Oracle SuperCluster M6-32 Configuration.

SuperCluster M6-32 provides an optimal solution for all database workloads, ranging from scan-intensive data warehouse applications to highly concurrent online transaction processing (OLTP) applications. With its combination of the Oracle Exadata Storage Server, Oracle Database software, and the latest hardware components, SuperCluster M6-32 delivers extreme performance in a highly available, highly secure environment. One example of the performance gains with SuperCluster comes with each Oracle Exadata Storage Server used in the rack. Each Oracle Exadata Storage Server uses Exadata Smart Flash Logging, which both improves user transaction response time and increases overall database throughput for I/O intensive workloads by accelerating performance critical database algorithms. In addition, since it is a large-memory engineered system, it's ideal for running mission

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SPARC M6-32 Servers Oracle's SPARC M6-32 server offers a large memory capacity and a highly integrated design that supports virtualization and consolidation of mission-critical applications. The Oracle SuperCluster M6-32 comes in either Base Configurations, or Extended Configurations.	• Sixteen to thirty-two SPARC M6 Processors—Each processor comes with 16 cores and eight threads per core. The SPARC M6 utilizes the latest advanced S3 core design. • 8 TB to 32 TB of Memory— 512 GB (16 GB DIMMs) or 1 TB (32 GB DIMMs) of memory per M6 processor. • Sixteen to thirty-two Disk Drives—There are eight 900 GB SAS2 disk drives per I/O Unit (IOU) • Oracle's Sun PCIe Dual Port QDR InfiniBand Host Channel Adapters—Low latency 40 Gb/sec InfiniBand HCA in a modular hot-pluggable PCI Express (PCIe) low-profile form factor. There are four InfiniBand cards in each IOU. • Eight to sixteen Base I/O Cards—These cards provide SAS controllers for the disks in an IOU. There are four in each IOU, and each card also provides two 10 GbE ports. The 10 GbE ports for client access to the Oracle SuperCluster.
Oracle Exalogic Provides extreme performance for key technology segments in the infrastructure.	• Java applications and Oracle Applications • Enterprise applications • Reduces application implementation and ongoing costs • Private clouds can be assembled from separately sourced components.

Integrated Virtualization	• Multiple Virtualization Environments
	    o Dynamic Domains (Physical Domains)
	    o Oracle VM Server for SPARC\
	    o Oracle Solaris Zones
	• Enhances Security, optimizes Utilization & improves Reliability

Oracle Enterprise Manager Ops Center Delivers a converged hardware management solution .	• Integrates management across the infrastructure • Assists IT managers in deploying/managing more efficiently.

Oracle Exadata Storage Expansion Rack:
 	
InfiniBand delivers up to 63 percent higher transactions per second for Oracle RAC versus GbE networks. There are three InfiniBand switches in SuperCluster offering private connectivity within the system.
	• **Oracle ZFS Storage ZS3-ES Appliance**
	    o Provides 80 TB of capacity,
	    o Uses flash-enabled Hybrid Storage Pools
	    o Storage Analytics using dTrace improves file based storage performance through drill down observability
	• **Nine Oracle Exadata Storage Servers**
	    o Improves Oracle Database Performance
	    o With Smart Scale Out Storage
	    o Exadata Smart Flash Cache
	    o Exadata Hybrid Columnar Compression
	• **Oracle's Sun Datacenter InfiniBand Switches**
	    o Includes three InfiniBand switches in SuperCluster offering private connectivity within the system
	    o High throughput, low latency, and scalable fabric suitable for:
	        ▪ Fabric consolidation
	        ▪ Storage Connectivity
	• **Ethernet Management Switch**
	    o Provides network management connectivity
	    o Manages ports on all servers and switches used in SuperCluster.
	    o Note: Cisco switch is provided and customers can use their own switch if desired.

Figure 2. Components of the Oracle SuperCluster M6-32.

critical applications in-memory such as JD Edwards EntepriseOne In-Memory Portfolio Management application.

As the newest member of the Oracle SuperCluster family, SuperCluster M6-32 offers new capabilities such as; More processing power with up to 32 M6 processors, more memory with up to 1 TB per physical M6 processor, more built-in I/O with 64 PCIe Gen 3 slots, and finally, all three levels of virtualization: Physical Domains (or PDoms), Logical Domains, and Oracle Solaris Zones.

Customers can integrate SuperCluster M6-32 systems with other Oracle SuperCluster systems, Oracle Exadata, or Oracle Exalogic machines by using the available InfiniBand expansion ports and optional data center switches. The InfiniBand technology used by SuperCluster M6-32 offers high bandwidth, low latency, hardware-level reliability, and security. For application environments that follow Oracle's best practices for highly scalable, fault-tolerant systems, no application architecture or design changes are required to benefit from SuperCluster M6-32. Deployments can also connect many SuperCluster M6-32 systems or a combination of SuperCluster M6-32 systems and Oracle Exadata Database Machines to develop a single, large-scale environment. Customers can integrate SuperCluster M6-32 systems with their current data center infrastructure using the available 10 GbE ports in each one of Oracle's SPARC M6-32 servers within SuperCluster
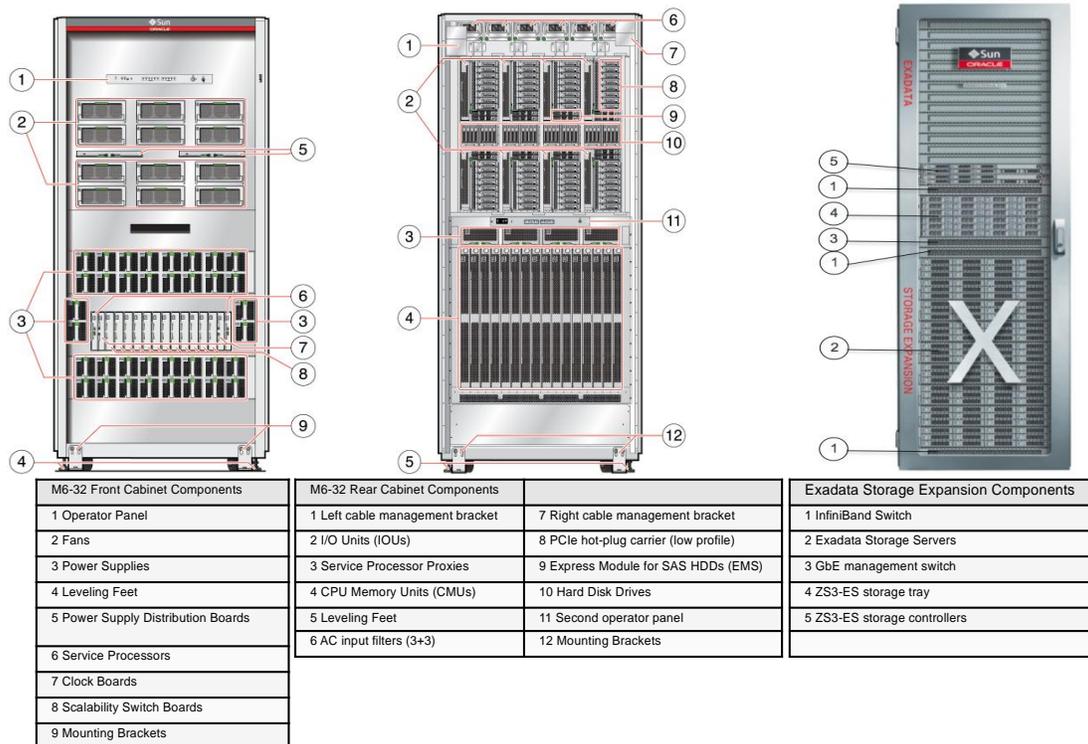

M6-32 Front Cabinet Components	M6-32 Rear Cabinet Components		Exadata Storage Expansion Components
1 Operator Panel	1 Left cable management bracket	7 Right cable management bracket	1 InfiniBand Switch
2 Fans	2 I/O Units (IOUs)	8 PCIe hot-plug carrier (low profile)	2 Exadata Storage Servers
3 Power Supplies	3 Service Processor Proxies	9 Express Module for SAS HDDs (EMS)	3 GbE management switch
4 Leveling Feet	4 CPU Memory Units (CMUs)	10 Hard Disk Drives	4 ZS3-ES storage tray
5 Power Supply Distribution Boards	5 Leveling Feet	11 Second operator panel	5 ZS3-ES storage controllers
6 Service Processors	6 AC input filters (3+3)	12 Mounting Brackets	
7 Clock Boards			
8 Scalability Switch Boards			
9 Mounting Brackets			

Figure X. Views of the Oracle SuperCluster M6-32 Engineered System

Deriving Business Benefits from the Oracle SuperCluster M6-32

It is important to understand the precise business benefits that result when deploying Oracle JD Edwards EntepriseOne In-Memory Portfolio Management on the Oracle SuperCluster M6-32. See the accompanying Figure below to gain insight into these business benefits.

TECHNICAL BENEFITS	BUSINESS BENEFITS
High Availability: The Oracle SuperCluster M6-32 is architected with built-in redundancy to minimize downtime	• Maximum productivity from uninterrupted mission critical business processes. • Reduced business disruption • Reduced risk of failure(s) • Improvements in regulatory compliance
High Performance	• Increased competitiveness through quick, informed decisions based on real-time access to business insights • Rapid business solutions and new opportunities development • Ned end user applications deployment that was not possible before, to improve business processes and employee productivity • Improved employee productivity by dramatically improving end user responsiveness • Ability to improve manufacturing, fulfill more orders, react to changes quickly by reducing or eliminating the batch processing times for critical applications • Increased revenue opportunities by timely completion of orders or services • Customer retention by increased customer satisfaction by delivering on-time services or goods and complying with service level agreements • Reduced total cost of ownership due to reduced need for developers or third party consultants required for tuning custom applications
Scalability	• Instance Consolidation • Global expansion • Efficient, rapid, low cost assimilation during mergers and acquisitions • Increased business units, users or transaction without worrying about performance degradation
Standardization	• Reduced TCO • Simplified deployments • Rapid deployments across enterprise in multiple business units and multiple regions
Advanced Storage for Analytics	• IT costs savings by reduced storage costs • Reduced IT costs through consolidation(s)

Figure 3. Business Benefits derived from the Oracle SuperCluster M6-32 technical highlights.

Oracle SuperCluster M6-32 and JD Edwards EnterpriseOne Portfolio Management

Single View of the Project Portfolio

In order to manage their business, project executives need to be able to see the financial status of all projects. On a regular basis (for example, monthly, quarterly, annually), project managers and executives are challenged to quickly aggregate, summarize, and analyze project financial information across the project portfolio to give them the amounts and metrics they need in order to make management decisions concerning each individual project as well as the entire project portfolio.

Reduce Time to Analyze and Manage Projects Across the Portfolio

JD Edwards EnterpriseOne currently provides deep and rich solutions for hundreds of project-oriented companies that successfully manage their projects world-wide. Companies have the ability to manage a wide variety of projects from very simple to very complex, from one project to hundreds of projects, from projects that are performed by internal resources to projects performed by subcontractors. And now the JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution leverages this robust functionality and takes it to another level by providing in-memory applications that deliver a real time view of key metrics across single or multiple projects. By leveraging the Oracle Engineered Systems technology of multi-threaded logic processing, the JD Edwards EnterpriseOne In-Memory Project Portfolio Management accesses the financial information of many projects at the same time, thus giving you the information you need quicker and changes the game in that you are now able to manage your entire portfolio rather than managing just your projects.

A Single Integrated Project Management Solution

JD Edwards EnterpriseOne In-Memory Project Portfolio Management when deployed on the Oracel SuperCluster M6-32 engineered system, provides real time access to project financial information in one application. This application provides you with the information you need to manage projects through the entire lifecycle from budgeting and planning, to project execution, change management, and billing to project closeout. By leveraging the Oracle Engineered Systems technology insert from select and aggregation, this provides a single view and eliminates the need for you to manually aggregate project amounts from multiple sources, thus saving you days of extra work each reporting cycle. You will see significant time saving in your day-to-day project management reviews as well as seeing a decreased time to prepare for your recurring project reporting cycles.

Figure 2. JDE Portfolio Management Analysis: Summarized Project Amounts.

The above figure shows an example of summarized amounts (such as original budgets, revised budgets, actuals, and projected final costs) graphed for all active projects for a company. You can quickly scan these amounts, determine which amounts are out of tolerance to the company's standards, and then drill down to specific projects within the portfolio to pinpoint any anomalies identified in the graph.

Visibility into Multiple Views of Projects

For project managers and project executives, there is not just one view of a project. Since projects have many different stakeholders involved, you need to view a project or series of projects with one view, focusing on the financial information pertinent to one set of stakeholders, and then quickly go to another view, and focusing on the financial information pertinent to another set of stakeholders of that same set of projects. For example, you may need to see overall project status for a company's four regions — east, west, north, and south to reflect the summary of projects by regional manager. And then, right after that, you may want to quickly change the view to look at these projects grouped by project manager to assess the performance of projects by project manager. These are only two ways you may want to look at projects but there are dozens and dozens of other ways you can view projects based on the ways you organize your business.

JD Edwards EnterpriseOne In-Memory Project Portfolio Management gives you the ability to quickly change the view of projects with just a few clicks. This allows you to quickly view all angles of projects to assess how the needs and interests of all stakeholders are being met with the goal that the projects are running on budget and with the optimum profitability.

Drill Down Capabilities Across Project Portfolio

With a single click, you can quickly navigate from the top of the portfolio down to individual projects and even down to individual tasks within a project.

With possibly hundreds of projects to manage within a portfolio, you have the ability to view, at a summarized level, the entire group of projects and then drill down to individual projects as you see anomalies or exceptions. This gives you a way to quickly and easily keep your project costs under control.

For example, a project executive may have responsibility for all projects within the east and west geographic regions. So, in this example, the project executive would see two summarized lines, which would represent all projects within the east region, and all projects within the west region. The project executive would be able to see all summarized information for each region such as total budgets, total actual costs, total projected costs, total billed amounts, and total cash received. And, if for some reason the project executive saw that some amounts did not look as expected, for example, the actual costs exceeded the budgeted amounts, the project executive could click on the region and have all the projects display for that region. The project executive could then quickly scan through this list and see which project or projects had actuals that exceeded the budgets. The project executive then could again click on a project to view the detailed tasks for that project to identify the task or tasks where the actuals exceeded budgets. And then the project executive could also drill into each task to view all individual transactions (including labor, material, or indirect costs) charged to this task. The project executive could then discuss these specific transactions with the project manager to better understand them and take appropriate action to keep the project on track.

Access to Actionable Tasks

JD Edwards EnterpriseOne In-Memory Project Portfolio Management facilitates a way for you to act on the amounts presented, to retrieve more information or update various aspects of a project when needed, provided that you have the security access rights for the information being requested or modified.

The system saves you time with the ability to access a number of actionable tasks. This may include access to account progress entry, job progress entry, budget revisions, work order management, contract billing, and change management. The sooner you can perform necessary actionable tasks, the better you will be able to mitigate project risk, reduce cost overruns, reduce waste and ultimately increase profitability and ensure projects remain on budget.

Project Metrics to Drive Management Decisions

Project managers and executive are buried with a huge volume of information across the project portfolio. They need a way to sort through this volume of information to help them quickly make informed decisions.

JD Edwards EnterpriseOne In-Memory Project Portfolio Management provides the ability for you to create user-defined calculations based on project amounts and units, and billing amounts. These user defined metrics can be standard metrics used in earned value analysis or can be specific to an industry or company.

Another way JD Edwards EnterpriseOne In-Memory Project Portfolio Management provides the ability for managers to quickly assess all aspects of their project portfolio is through visual status indicators.
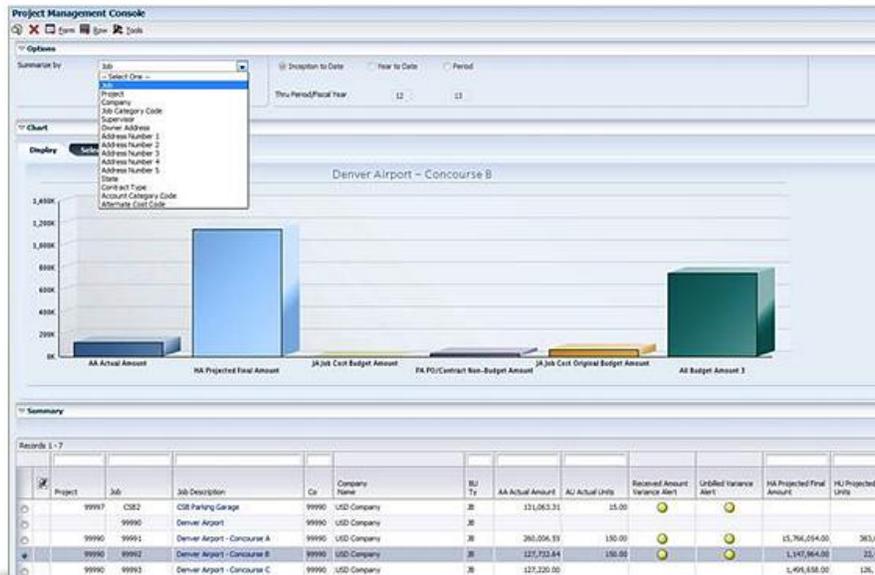

Figure 4. Project Management Console

Another way JD Edwards EnterpriseOne In-Memory Project Portfolio Management provides the ability for managers to quickly assess all aspects of their project portfolio is through visual status indicators.

Figure 2 shows how project managers can quickly identify issues in their projects, thus help identify and prioritize issues so project managers can better manage their time to work on the most important/critical issues first.

Mid-period reporting

With low margins and high risks, project managers require real time access to all costs related to a project in order to ensure that projects remain on budget. Project managers need to be aware of charges to projects as they occur in real time. For example, project managers need to be aware of up to the minute updates to the purchase orders charged to a project to ensure that the proper material and subcontract labor has been ordered. The project manager has the ability to react quickly to any questionable transactions against a project, thus keeping projects on budget.

The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution provides the ability to view transactions charged to a project made mid-period. You have the ability to view posted or un-posted transactions against projects.

Increase Management Control of Global Multi Currency Projects

As companies become more global, many of them will diversify the work of a large project into smaller projects, which can span multiple geographic regions and incur costs in multiple currencies. Some of these smaller projects will be managed in the local currency but project managers have the need to manage the entire multi-currency project with a view in a single currency.

Common Currency for Management Control

The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution provides real time "as-if" currency conversion for multicurrency projects. When an "as-if" currency is specified, the system will automatically convert and display all amounts in the currency specified.

View Affects of Currency Exchange Fluctuations

The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution provides real time "as-if" currency conversions based on specified "as-if" currency exchange rate dates for multicurrency projects. The risk you have when outsourcing project work to different parts of the world is that currency rates can fluctuate drastically and can quickly eat away at project profits because of the change in the value of various currencies.

With the ability to specify "as-if" currency exchange rate dates, you can use the projected future currency exchange rates and see the affects they have on their global projects. This will help you

determine if they should continue to do work in certain parts of the world or move some work from one location to another where the currency exchange rate and associated fluctuations are less volatile.

Optimizing Project Profitability

Many project-oriented organizations, such as engineering and construction firms, run their business with low margins and so the need to manage and track cash flow for all projects is crucial. Executives need to be able to assess the profitability of any project or group of projects.

Project cost management is a primary activity throughout the lifecycle of a project. In order to manage costs affectively, project managers are challenged to track and manage a variety of project-related amounts.

On one hand, project managers are challenged to minimize costs. Cost-related amounts project managers are concerned about include budgeted and actual costs, open commitments, and projected final amounts.

On the other hand, project managers are challenged to see what they can do to optimize profitability. Amounts the project managers are concerned about related to profitability include potential billed amounts and billed/invoiced amounts.

Throughout the lifecycle of each project, project managers continuously manage the work and related costs while at the same time gaining insight into how projects are contributing to the cash flow and the profitability of the organization. With this insight into profitability, project managers may make changes to the work being done or who does the work to drive increased billing and profitability.

The challenge is that the way project managers manage their projects (focusing on budgets, actual costs, estimate to complete and earned value) does not always easily coincide with the ways a company's customers require they are billed (focusing on markups, fees, etc).
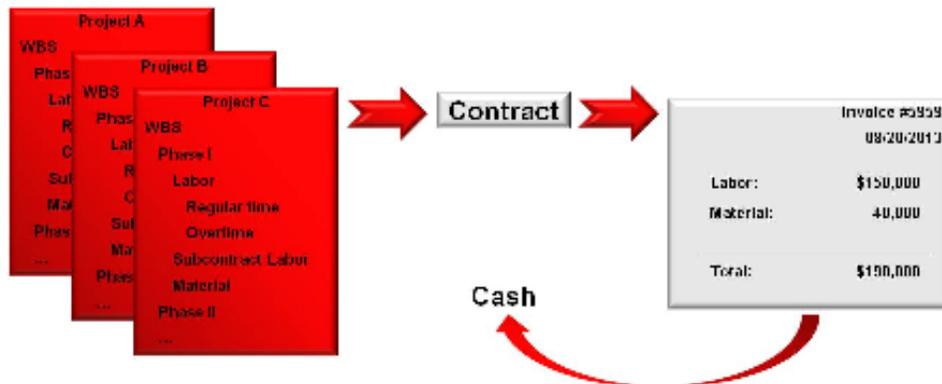

Figure 4. Project Work Breakdown Structures

Figure 4, shows an example of how three projects with work breakdown structures (WBS) that include regular time, overtime, and subcontract labor are associated with one contract and the customer wants to be billed for one summarized amount for labor. Because project costs do not always align with

billing amounts, project executives are challenged with manually pulling this information together each month to gain insight into project profitability.

Increase Project Profits

Monitor Project Profitability with Project Billing

By leveraging the Oracle Engineered Systems technology of multi-threaded logic processing, insert from select and aggregation, the In-Memory Project Portfolio Management solution ties the project financial amounts (budgets, costs, open commitments, projected costs, etc) with the associated billing together into a single, consolidated view.
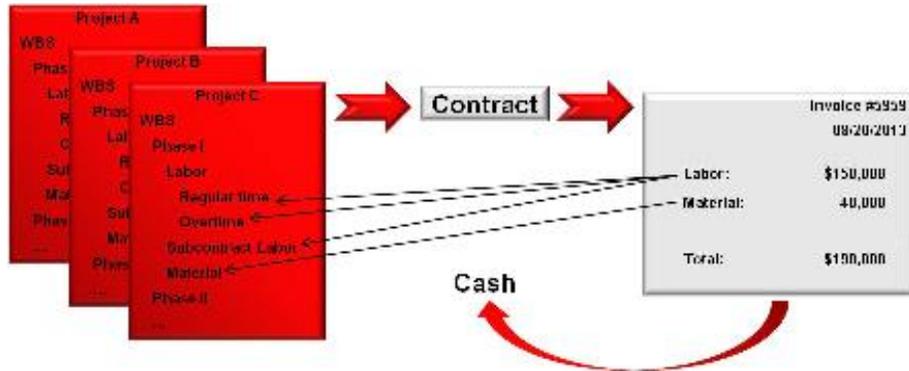
Figure 5. Billing Amounts for Labor in each Project's Work Breakdown Structure.

Figure 4 takes that same example above and shows that the billing amounts for labor can be directly tied to each individual labor task in each project's WBS.

With this solution, project managers, throughout the lifecycle of each project, can continuously manage the work and related costs while at the same time gaining insight into how projects are contributing to the cash flow and the profitability of the organization. With this insight into profitability, project managers can make changes to the work being done or who does the work to drive increased billing and profitability.

This gives you insight into project profitability. For projects associated with time and material billing, you can see the invoice amounts down to the specific tasks in the WBS. These invoice amounts typically include markups, fees, and other additional charges. For all other types of billing, you will be able to see the invoice amounts at the project level. During the course of the execution of a project, using JD Edwards EnterpriseOne In-Memory Project Portfolio Management, you will have real time insight into a project's profitability.

Increase Insight into Cash Flow for Projects

Besides optimizing profits, project-oriented organizations that have low margins are also challenged with the fact that they limited cash on hand. And so after a customer has been billed for the work done on a project, the project managers are not finished with their work. It is equally important for project

managers to have insight into what their customers have paid. Once a customer is billed, it could be 30, 60, or 90 days or more before a payment is received. So knowing what projects and type of work are getting paid is crucial for management. By having insight into the cash brought in for each project helps management make informed decisions on how to use the limited cash available.

Monitor Cash Tied to Projects

The JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution automatically ties the project amounts (budgets, costs, open commitments, projected costs, etc) with the associated billing and paid receivables. And the paid receivables could be partial payments or full invoice payments.
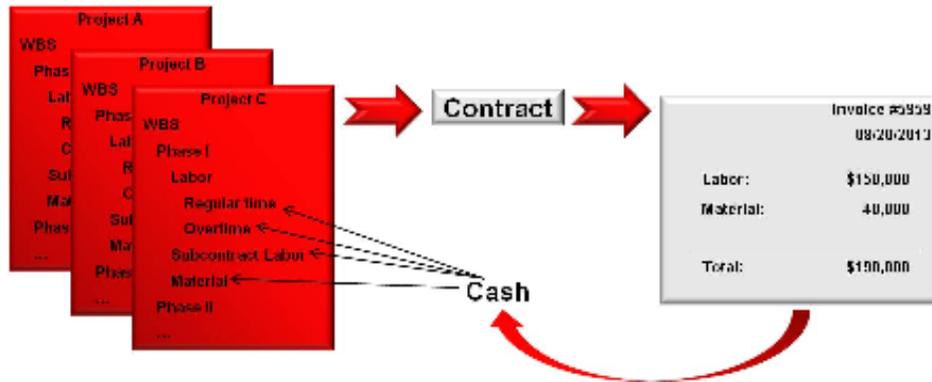
Figure 6. Apportioning Customer Revenue to Individual Tasks within a Work Breakdown Structure.

Figure 5 takes the above example one more step to show the cash received from the customer can be apportioned to the individual tasks within the WBS for each project.

This gives you insight into cash related to a project. For projects associated with time and material billing, you can see the invoice and receivable amounts down to the specific tasks in the work breakdown structure. For all other types of billing, you will be able to see the invoice and receivable amounts at the project level. During the course of the execution of a project, using JD Edwards EnterpriseOne In-Memory Project Portfolio Management, you will have real time insight into the available cash.

Optimizing In-Memory Cost Management on the Oracle SuperCluster M6-32

(Placeholder for Performance Narrative – REMOVE WHEN APPROPRIATE !!!)

Conclusion

Managing the entire project portfolio for project executives and project managers is a critical part of any project-oriented organization. The process to aggregate, summarize, and analyze consolidated project information can be very time consuming for your staff. Informed business decisions and

planning are at risk whenever access to the timeliest information is delayed by this process. By using Oracle Engineered Systems such as the JD Edwards EnterpriseOne In-Memory Project Portfolio Management solution, the summarization, aggregation, and analysis of projects within a portfolio can be done quickly and efficiently within a single view to ensure that projects remain on time and on budget. These systems significantly decrease the amount of time the system takes to facilitate your earned value and other analyses. This will give your staff access to the results faster; allow them to take appropriate actionable steps quicker; and provide accurate and timely information to executives and managers for planning and decision making purposes.

Oracle Engineered Systems such as the Oracle SuperCluster M6-32 coupled with JD Edwards In-Memory Portfolio Management offer unequaled performance gains and time reduction for processes like the management of projects. Companies can re-think their internal expectations and improve their processes. This will result in a reduction in waste, timely initiation of project change controls, and increased portfolio performance with utilization of available cash. Hardware and software designed to work together provides optimization to key processes.

For More Information

TABLE 1. ADDITIONAL RESOURCES

WEBSITES	
Oracle Database	Oracle Database
Oracle Optimized Solutions	Oracle Optimized Solutions
Oracle SPARC SuperCluster	Oracle SPARC SuperCluster
Oracle's SPARC M5 Series	Oracle's SPARC M5 Series
Oracle Solaris	Oracle Solaris
Oracle's Sun ZFS Storage Appliance	Oracle's Sun ZFS Storage Appliance
ORACLE SPARC M6 SERIES WHITE PAPERS	
"Oracle's SPARC M5-32 Server Architecture"	"Oracle's SPARC M5-32 Server Architecture"
"Maximizing Application Reliability and Availability with SPARC M5-32"	"Maximizing Application Reliability and Availability with SPARC M5-32"
"Consolidation Using the SPARC M5-32 High End Server"	"Consolidation Using the SPARC M5-32 High End Server"
IN MEMORY COST MANAGEMENT	
Data Sheet	Oracle and SAS partnership
White Paper	SAS Marketing Automation

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Oracle is committed to developing practices and products that help protect the environment

Hardware and Software, Engineered to Work Together