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Enterprise Solutions

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**APPENDIX J – TECHNOLOGY FOR ABT
INFRASTRUCTURE ASSESSMENT**



King County

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1 INFRASTRUCTURE ASSESSMENT INTRODUCTION

CIBER was tasked with defining a technology infrastructure for a five year plan for King County's hardware to support: Oracle eBusiness Suite (EBS) Financials (version 12) and PeopleSoft Human Capital Management (HCM)(version 9.0).

The county is a current user of Oracle eBusiness Suite (version 11.5.10) and PeopleSoft HCM (version 8.9). The existing hardware for these environments include HP-UX and Windows servers. CIBER objectives for the Infrastructure Assessment include:

- Standardizing on a common operating system OS as much as possible
- Maintaining or improving performance and management of the infrastructure without significantly adding to the current cost of support
- Leverage existing investments whenever possible
- Leverage work previously performed by Oracle in its Infrastructure Optimization Roadmap (version 2.4)

Based upon the business requirements gathered during the Detailed Implementation Planning (DIP) for the ABT Program, review of existing King County Information Technology (IT) standards, review of Oracle's Infrastructure Optimization Roadmap and research of existing Oracle and PeopleSoft installs, CIBER has concluded that there are two options:

1. Standardize on HP-UX operating system running on a BladeCenter solution
2. Convert to a Linux environment running on a BladeCenter solution

There was a third option considered of standardizing on HP-UX running on stand alone servers with virtualization. This option was dismissed when the delta in price exceeded well over \$1 million in upfront acquisition cost. This option also had the highest long term recurring cost.

The deliverable that follows concludes the justification of either an HP-UX or Linux footprint in each of the following areas:

- Business Requirements
- Existing Standards/Investments
- Oracle Infrastructure Roadmap Initiatives Response
- Install Base Representation
- Budget
 - Hard costs
 - Soft costs

1.1 BLADECENTER

CIBER assumed that whenever fiscally prudent, a BladeCenter solution would be proposed. Our preference for BladeCenter systems stem from the total cost of ownership in comparison to Rack optimized. Numerous studies have been done that indicate that a BladeCenter is a lower cost solution over the long run. CIBER will share these studies with any parties that are interested.

2 BUSINESS REQUIREMENTS

The business requirements for Oracle eBusiness Financials and PeopleSoft HCM were gathered throughout the DIP process and were summarized in Section 12, Appendix A: Technology Architecture Business Requirements. These requirements were used in conjunction with the sizing assumptions below. Although these assumptions contributed to the actual server/resource need from a hardware sizing perspective, they did not impact the decision of HP-UX versus Linux as an OS. All three applications are open in the sense that they will run on either OS with Oracle DB. In this category, a neutral scoring was assessed for each option.

The sizing requirements needed for the Oracle eBusiness Financials infrastructure include the following:

Financials	Logged on Users	Light	Medium	Heavy
Financials (Forms)	350	228	98	25
Internal Control Manager	12	6	6	
Enterprise Asset Management (Forms)	41		35	6

Manufacturing	Logged on Users	Light	Medium	Heavy
Option: Advanced Collections (Forms)	25		25	

Order Management and Logistics	Logged on Users	Light	Medium	Heavy
Order Management (Forms)	8		8	
Inventory Management	20		20	

Procurement	Logged on Users	Light	Medium	Heavy
Purchasing (Forms)	84	20	60	4
iProcurement (JSP)	420	294	126	
Purchasing Intelligence (Rep./Discov.)	6		6	

Projects	Logged on Users	Light	Medium	Heavy
Project Costing (Forms)	625	390	210	25

The sizing requirements needed for the PeopleSoft HCM infrastructure include the following:

Human Resource Management Services (HRMS)

Peak Concurrent Active Users

	Heavy	Medium	Light	Self Service
All HRMS Users	510	75		1000

Batch Information

North American Payroll <i>Global Payroll</i>	
Total Employees to be Paid	16000
Number of Paygroups	1
Largest Paygroup (# Employees)	16000
Desired processing time for PayCalc and PayConfirm steps in Hours	2
Time of Day Range for Payroll Batch Processing	Online hours
Time & Labor	
Total Employees to process/night	8000
Hours to process	1

Enterprise Portals

Peak Concurrent Active Users

	Named	Concurrent
All Portal Users	16000	2500

Reporting

Reporting Tools	Peak # of Concurrent running Reports
PeopleSoft Query	100
SQR	70
Crystal Reports (Requires Windows)	80

3 EXISTING INVESTMENT/STANDARDS

The county would like to leverage a recent investment in PeopleSoft infrastructure as much as possible in the future state environment. This would not be a possibility in the Linux option proposed but it is with the HP-UX Blade option proposed. CIBER has suggested that two of these PeopleSoft RX3600's be redeployed into the future state environment. The sizing that came back from HP warranted a stand alone DB server for the Oracle eBusiness DB Server. The PeopleSoft DB and Reporting DB Servers were concluded to be acceptably run on HP-UX Itanium Blades (BL870C).

CIBER has identified the ability to use the 8.9 environment's existing non-production DB server (PILCHUCK) for the PeopleSoft version 9.0 Reporting DB Server. This assumes that the county would back-up the existing environments, reconfigure the server and migrate the data as appropriate when the 9.0 Reporting DB Server was needed. The second existing server to be leveraged would be to use the current version 8.9 Production DB Server (WHISTLER) as the Oracle EBS Reporting DB Server in the future state 9.0 architecture. This would eliminate the need to buy two servers.

Another option would be for the county to use PILCHUCK as part of the future state budgeting system. The budgeting System will most likely require at least a Production and Test/Development environment. If timing for the budgeting deployment is appropriate, PILCHUCK could be used for the Test/Development server and other servers (WHISTLER, HOOD and SHASTA) could be used when ready to convert into production.

The scoring for leveraging existing environment favors HP-UX for these reasons.

The standards below were extracted from the KC IT Infrastructure Standards provided to CIBER/ABT Program by the King County Office of Information Resource Management (OIRM). These standards drove the decision to use HP as a hardware provider for the servers. From an operating system perspective, the existing standards would lead CIBER to give HP-UX a stronger suggestion than Linux. The justification of this decision is the well established knowledge base of policies/procedures associated with this platform versus Linux. Linux being in a developing state with only two servers supported would suggest a need for cross training of existing support personnel due to the future state infrastructure. Furthermore, there is an added risk factor of adopting a new OS in conjunction with converting all users onto a countywide enterprise resource planning (ERP) system. In this type of environment, keeping as many moving parts as stable as possible would only add to the probability of success.

3.1 SYSTEM SOFTWARE

- OIRM Systems Engineering (SE) standards mandate the following:
 - Intrusion detection capabilities.
 - Automatic alert notifications (similar to HP OpenView) for errors and threshold alarms.
 - Real-time and logged performance monitoring.
- Must be capable of supporting change management and migration to production procedures.
- Ability to run Oracle Enterprise Manager.

3.2 SYSTEM HARDWARE

OIRM Systems Engineering server standards:

- Redundant power supplies and fans.
- Hardware RAID for internal disks (or software if hardware is unavailable).

- 24x7 vendor hardware and software support contract.
- 1Gb/s NIC.
- HP or DELL server

OIRM Data Center hardware requirements:

- Servers must have auto ranging power inputs (typically 100-240VAC) to accept either 120V or 208V. (Current racks typically use 208V input to rack power distribution unit).
- If vendor supplies racks as part of the design, they must also include rack power distribution.
- If vendor supplies racks as part of the design, they must also include rack mountable keyboard/monitor/mouse and Keyboard, Video Mouse Switch.
- Servers should be compatible with multi-vendor type KVM switch, keyboard and monitor system (or suitable monitor solution should be provided by the vendor).
- All equipment must be UL listed.
- All cabling must comply with applicable NEC, NFPA and UL requirements.
- Servers and communications equipment should be rack mountable in a 19" wide standard rack mount (alternates may be available - coordinate through Data Center Facility Engineer).
- Systems, equipment and enclosures cannot be more than 68.5" in height due to fire code ceiling clearance restrictions and earthquake mounts.
- All servers and communications equipment should be designed so that they can be seismically stabilized.
- All server cabinets should be equipped with a locking door (for reference - current data center rack standard is HP 10636).

3.3 PLATFORM STANDARDS

Operating System (OS) standards:

- HP-UX – established processes, procedures, tool infrastructure and skill set in this platform. Currently 17 HP-UX servers supported in SE.
- Windows – established processes, procedures, tool infrastructure and skill set in this platform. Currently 185 Windows servers supported in SE.
- Red Hat Linux – developing processes, procedures, tool infrastructure and skill set in this platform. Currently 2 Red Hat Linux servers supported in SE.

Given the representative processes, procedures, tool infrastructure and skill set in these platforms, CIBER would recommend UNIX in this category. The overall transition to enterprise-wide solutions for HR and Financials will be a smoother transition with a more mature infrastructure. Having 17 HP-UX servers supported would infer that there is substantial support resources trained and proficient in UNIX versus Linux which only has 2 servers supported.

4 ORACLE ASSESSMENT

Oracle performed an assessment of King County’s infrastructure in the beginning of 2008. The assessment resulted in the recommendations for infrastructure that follow. While Oracle suggests standardizing on Oracle Linux, CIBER reviewed the other 8 recommendations exclusive of OS. CIBER’s goal was to objectively consider the fit of these suggestions for the ABT Program initiatives.

The recommendations #1, #4 are referencing the database version 10.2.x and above.

1. Implement Real Application Cluster (RAC) database architecture
2. Use Oracle partitioning to better manage performance, backup and recovery
3. Implement integrated application performance monitoring tools
4. Standardize on Oracle Data Guard and RMAN Backup for disaster recovery
5. Implement RAC test/staging environment for each production system
6. Leverage “GRID Control” for proactive database management
7. Standardize on Linux
8. Leverage Virtualization for development and test environments
9. Implement Real Application Testing Strategy

Figure 1 - Value / Effort Recommendation Map

<p>#1 - Implement Real Application Cluster (RAC) architecture</p>	<p>Impact: High</p> <p>Better utilization of hardware resources enables use of commodity low cost hardware to create highly scalable and reliable systems.</p> <p>Reduces cost of database service</p> <p>Flexible growth – on demand capacity, especially in highly unpredictable timeframe schedule and usage patterns.</p> <p>If combine with standardization and consolidation efforts, it will lead to significant reduction in the maintenance cost.</p> <p>Risks1: Medium</p> <p>Learning curve for new environment</p> <p>Implementation timeframe can overload the existing responsibilities of DBAs</p>	<p>Effort: High</p> <p>Cost: \$\$\$</p> <p>Requires purchase of modular hardware environment and additional Oracle RAC licenses</p>
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1 Additional typical risks to RAC architecture do not apply to the King County environment: (1) lack of control over 3rd party technical certifications, (2) hosting of multiple database versions on single hardware, (3) unique combinations of storage, OS, and hardware.

	<p><i>Risk mitigation steps:</i></p> <ul style="list-style-type: none"> ▪ Training classes for 10gR2 RAC ▪ Early implementation of “sandbox” environment to test drive technology. ▪ Hire on-site RAC experts for the initial design and implementation phase, include time for documentation and knowledge transfer. 	
<p>#2 - Use Oracle partitioning to better manage performance, backup and recovery operations</p>	<p>Impact: High</p> <p>Increase system operational performance</p> <p>Simplify and reduce backup complexities & time requirements</p> <p>Reduce recovery time from data losses or corruption</p> <p>Remove complexities of data pruning or archiving</p> <p>Risks: None</p>	<p>Effort: Medium</p> <p>Requires coordination across teams to perform application usage analysis that will drive the partitioning strategy.</p> <p>Cost: \$\$\$ Requires license of partitioning option for production, staging and development environments.</p>
<p>#3 - Implement integrated application performance monitoring tools</p>	<p>Impact: High</p> <p>Increases visibility into system performance and operational metrics</p> <p>End to end monitoring capabilities (from user UI to database query IO and execution plan)</p> <p>Risks: Low Learning curve for new tools</p> <p><i>Risk mitigation steps:</i> technical training²</p>	<p>Effort: Medium</p> <p>Requires installation of target agents and placing of automated “beacons” at end-user network locations + management infrastructure.</p> <p>Cost: \$\$\$ requires license of management tools (packs for BEA, OS platform, tuning, diagnostics, etc)</p>

² “Oracle Enterprise Manager 10g Grid Control” 5 days class - This course introduces students to Oracle Enterprise Manager 10g Grid Control.

<p>#4 - Standardize on Oracle Data Guard and RMAN Backup for disaster recovery</p>	<p>Impact: <i>Medium</i></p> <p>Minimizes / eliminates potential for data loss</p> <p>Improve overall DR & HA using combination of database features</p> <p>Risks: <i>Low</i></p> <p><i>Risk mitigation steps:</i> DBA Data Guard and RAC classes are available, recommended for 10g R2 environments only</p>	<p>Effort: <i>Medium</i></p> <p>Cost: \$\$ Possible license for standby systems required</p>
<p>#5 - Implement RAC test/staging environment for each production system</p>	<p>Impact: <i>Medium</i></p> <p>A risk mitigation technique and best practice in introducing the RAC architecture</p> <p>Use of commodity, standard components might provide for swappable RAC building blocks between production and test/staging environment modular components</p> <p>Risks: <i>NA</i></p>	<p>Effort: <i>Low</i></p> <p>Cost: \$ RAC development licenses</p>
<p>#6 – Leverage “GRID Control” for proactive database management</p>	<p>Impact: <i>Medium</i></p> <p>Proactive database management</p> <p>Reduce pain points in the area of Database Patch Management.</p> <p>Reduced cost of maintenance through automation, improved system security and SLA monitoring of database services through functionality of certified configurations and policy compliance</p> <p>Risks: <i>None</i></p>	<p>Effort: <i>Medium</i></p> <p>Requires installation of target agents on all production databases</p> <p>Cost: \$\$ requires license of management tools</p>

<p>#7 – Standardize on Linux</p>	<p>Impact: <i>Medium</i></p> <p>Simplify infrastructure through standardization</p> <p>Reduce administrative skill sets and processes required to run the current diversified infrastructure.</p> <p>Reduced total cost of ownership for infrastructure and maintenance.</p> <p>Risks: <i>Low</i> <i>Risk mitigation steps:</i> Linux training Use Oracle Validated Configurations</p>	<p>Effort: <i>Medium</i></p> <p>Redeploy systems from proprietary operating systems to Linux. Best time is during hardware refresh.</p> <p>Cost: \$\$ Reduction in costs for commodity hardware and operating system. Very small fee for Linux enterprise support.</p>
<p>#8 – Leverage Virtualization for development and test environments</p>	<p>Impact: <i>High</i></p> <p>Simplify provisioning of application environments. Increase utilization of hardware while maintaining fault isolation between systems. Allow unprecedented flexibility in managing and providing application environments. Significant increase in customer service</p> <p>Risks: <i>None</i></p>	<p>Effort: <i>Medium</i></p> <p>Redeploy systems from proprietary operating systems to Linux and then to Oracle VM images. Build application gold images for future provisioning.</p> <p>Cost: \$\$ Reduction in costs for maintaining multiple environments. Reduction in hardware costs from higher utilization. Very small fee for Oracle VM enterprise support.</p>
<p>#9 – Implement Real Application Testing</p>	<p>Impact: <i>High</i></p> <p>Radically simplifies the task of assessing the impact of changes on a production system. Provides low overhead process to capture real production workload and replay it on a test system. Also provides tools to detect and diagnose the impact of changes for both improvements and regressions.</p> <p>Risks: <i>Reduces Risk of incomplete testing releasing defects from system changes into production.</i></p>	<p>Effort: <i>Medium</i></p> <p>Installation of Real Application Testing software.</p> <p>Cost: \$\$ Decrease – Reduction in labor allocated to testing system changes and patches. Can reduce effort from months to days. Increase - License cost of Real Application Testing option.</p>

4.1 CIBER'S SUMMARY RESPONSE TO THESE RECOMMENDATIONS IS HIGHLIGHTED BELOW:

1: Implement Real Application Cluster (RAC) Architecture: RAC is primarily used when the computing situation requires either 24x7x365 availability, and/or when the future capacity growth is unknown (extreme example: Google). If the computing environment is absent of either of these needs, the justification for RAC is significantly reduced. The decision to implement RAC, when the above primary requirements are not present, needs to be balanced with the increased complexity and load on the organization's DBAs and UNIX/Linux System Administrators. CIBER has had two clients (Levy & RTD) where CIBER implemented RAC and upon CIBER's departure, the clients took RAC out due to the maintenance load on their lean IT support staff.

There is an additional niche situation where RAC can be justified and that is when replacing name brand servers (HP HP-UX, SUN Solaris, IBM AIX) with commodity level Intel based servers running Linux. In this situation the cost benefits of buying inexpensive non-brand name Intel servers can be significantly lower (even with the additional Oracle RAC software licensing) than buying high-end UNIX system. The trade-off is again the increased complexity and in some cases the severe limitations of the commodity servers themselves. The greatest limitation, from a DBA perspective, is that on the 32-bit x86 Intel hardware the largest SGA you can have is 4GB, which compared to a 64 bit HP UNIX environment with maximum of 4,000,000TB of SGA, severely reduces the amount of data that can be stored in memory, requiring the database to retrieve data from disk, and reducing overall system performance.

Based upon business requirements CIBER is recommending that the county forego adopting RAC.

2: Data Partitioning: Oracle Software option that lets you sub-divide tables and indexes to increase query performance. An example of partitioning would be to take a very large custom table storing accounting transactions and partition it by accounting year or month. In that example, any query for data within a particular account year/month would only pull information from that partition rather than having to search through the whole non-partitioned table. Another example would be if the query crosses several accounting years/months, only those partitions needed to satisfy the query would be accessed; rather than the whole table. This capability significantly reduces query times.

The caveat is that the benefit of data partitioning is only realized in situations with very large tables. According to current Oracle information these would be tables that have 10 million or more rows of information in them. In the event that projected growth puts King County in this situation, the cost of Data Partitioning is justifiable. Data Partitioning can also be applied at a later date in the event that it is not initially needed but would be long term. The decision of when to adopt Data Partitioning can be decided by how soon the county will hit the 10 million row threshold. In today's environment of 6,000 employees utilizing Time and Labor with PeopleSoft, the county is already near 60% of this threshold. The addition of the remaining King County employees to the Time and Labor system will exceed this threshold. For this reason, CIBER would suggest that the county follow Oracle's recommendation to implement Data Partitioning for PeopleSoft but not for Oracle at this time.

3: Performance/Monitoring Tools: Oracle offers various performance monitoring and diagnostic and tuning plug-ins for their Enterprise Manager (EM)/Grid Control product. The performance monitoring tools provide the ability to automatically monitor and notify DBAs and Administrators of situations that need attention before they become critical. These performance monitoring tools are very beneficial in client environments that have lean IT staff.

Oracle's diagnostic and tuning plug-in is one set of tools that is recommended; particularly for use with installations that are running Oracle Applications, or PeopleSoft. The driver is that both software

products use significant canned SQL and PL/SQL code that cannot be changed. In cases where this code is causing a performance problem this tool will help identify for Oracle Support use. More importantly, the tool will enable the county to analyze the code and develop recommendations to improve performance without having to change the code. These recommendations can range from adding a new index to implementing a different SQL execution plan for the code.

CIBER strongly recommends that the county adopt this recommendation from Oracle.

4: RMAN & Data Guard: The decision to use Oracle's Recovery Manager (RMAN) for backup and recovery is easy. It comes free with the Oracle RDBMS and if the county is not using it today, it should.

Data Guard is one of a set of Oracle tools focusing on protecting data availability, tools that range from RMAN on the low end (i.e. basic backup and recovery) through Data Guard at the mid point (i.e., standby database and replication) to RAC on the high end. These tools facilitate disaster recovery planning to allow business continuance regardless of whether an unforeseeable event affects the server, the data center or the city the data center resides in.

Data Guard is an appropriate solution for King County particularly once King County moves to the 11g database. Data Guard creates and maintains one or more standby databases that are consistent with the production database for disaster recovery purposes. Currently King County utilizes a nightly copy of the existing database as a reporting database. This could be used as the standby option in the future state environment running 10g DB.

With 11g, the county could create a standby database that can be open for reporting use while at the same time being updated from the production database. Essentially the county would have a standby database that is constantly up-to-date for both disaster recovery and for use as a report server. Because the ABT will be using the 10G database, Data Guard can be used to create the standby database at night and that database can be used for reporting. It will not be until later when the county is on 11g that the real-time feature can be used.

The trade-off is whether the licensing cost of the standby database option is offset by the ability to perform real-time reporting and to maintain some level of fail-over/disaster recovery.

CIBER strongly recommends that the county use RMAN. CIBER strongly recommends the county move to the use of Data Guard once 11g is in place. Until that time, cost must be factored into a decision given the reduced benefit that Data Guard offers. ABT should continue to replicate the production database nightly for reporting and standby purposes using either current methods or by beginning to use Data Guard.

5: Implement RAC Test/staging Environment: For reasons specified in Oracle recommendation 1 above, CIBER is not suggesting a RAC environment at King County. If the county prefers to implement RAC, it will need to make sure that the testing environment and/or QA/Staging environment also be RAC. The county should always test on an exact configuration copy of production.

6: Grid Control: Grid Control's greatest benefit is when it is combined with the performance monitoring, tuning and diagnostics plug-ins described above. The base software is nice in that it provides a graphical interface for the various standard DBA information items. Information such as; amount of free space, SGA memory usage, hit ratios are shown in nice graphs rather than the standard column and row format that is shown from a DBA script.

For Oracle Applications there is a patch that can be installed that integrates Oracle Application Manger (OAM) with Grid Control to provide a consolidated, end-to-end e-Business Suite management solution. For this reason alone, CIBER would strongly recommend implementing Grid Control.

7: Standardize on Linux: CIBER agrees that the county should standardize as much as possible on an Operating System, it is debatable as to whether UNIX or Linux is the right choice. That decision will be driven from the remainder of the CIBER assessment categories. It is important to note that Oracle suggested its Unbreakable Linux in the Infrastructure Optimization Roadmap. The county standard for Linux as referenced in the “Existing Standards” section above is Red Hat Enterprise Edition. Based upon this standard, CIBER would suggest Red Hat’s Linux if selected over UNIX. Please see Section 7 - Conclusion for final recommendation.

8: Utilize Virtualization: Virtualization is a concept of hiding the physical nature of a server or computing resource from the end user of the application. It enables a single computer to look like multiple computers.

On the Intel/Linux platforms there are numerous Virtualization vendors to choose from, including: VMWare, Oracle and RedHat. The primary UNIX vendors (HP, IBM and SUN) each have their own proprietary Virtualization software.

The Virtualization decision usually comes down to a financial decision of whether the cost of buying one or two large systems, with VM software makes more sense than buying numerous smaller systems. One of the big benefits is the potential to decrease the data center footprint, thereby decreasing cost.

Consideration must be given to High Availability in environments running Virtualization. If a physical machine hosting four virtual machines goes down, recovery can be challenging elongating an outage. In the business requirements section of the analysis, King County showed a relatively high tolerance for down time but the use of Virtualization at this point would add risk. Although being connected to a Storage Area Network (SAN) provides some assurances, it is recommended that architectures using Virtualization also run a High Availability solution.

Virtualization adds both complexity and cost to the management of the infrastructure, especially in an Enterprise the size of King County. Cost factors to consider include: High Availability as mentioned previously, the cost of administration and the cost of training resources. For this reason, CIBER is suggesting that the county forego Virtualization.

9: Implement Real Application Testing: This is an Oracle 11g RDBMS additional cost option that lets you capture workload information and then replay it for performance testing purposes. The benefit is that the replay will let you make changes and then the replay will use those changes during the replay allowing you to observe the affect of the changes on database performance. The changes can be database initialization parameters, or new SQL code, or new PL/SQL code, or a new report, or adding new hardware like more CPUs. The biggest benefit is that you are able to test changes and outcomes against real world workloads, not simulations.

This tool is only an option with Oracle 11g RDBMS and on. Since the county will not be on this DB release during the implementation lifecycle, the county must forego this recommendation.

10: Conclusion of Response to Oracle Roadmap: In summation, with the exception of the recommendation to standardize on Linux, there are no other areas that would impact the decision of

which Operating System to select. All suggested tools and solutions will work on either Operating System.

CIBER assesses the overall Oracle Infrastructure Optimization Roadmap as neutral in determining OS.

5 INSTALL BASE REPRESENTATION

Although it is important to look to the future regarding technology and advancements, it is wise to not disregard the present. Although Oracle is a strong proponent of Linux and according to its Web site, has 2,000 Unbreakable Linux clients, the county should consider what other Public Sector entities are doing. The table below reflects an assessment of existing CIBER and Solbourne Public Sector installations for both PeopleSoft and Oracle performed during the DIP project:

Application	Operating System	Total Installs	% of Sample Total
PeopleSoft	Windows	13	27.7%
PeopleSoft	UNIX	30	63.8%
PeopleSoft	Linux	4	8.5%
	PeopleSoft Total	47	
Oracle	Windows	3	8.1%
Oracle	UNIX	26	70.3%
Oracle	Linux	8	21.6%
	Oracle Total	37	

A general observation was that installations with smaller operating budgets and employee counts favored Windows and Linux platforms while the larger enterprises favored UNIX platforms.

6 BUDGET

6.1 HARD COSTS

The table below reflects the costs associated with the hardware, database software, operating system and Application Support needed for this project for HP-UX and Linux platforms. This analysis covers the initial procurement and the first year of support.

Estimated OIRM App Support pricing was based upon CIBER's best estimate of the 2008 OIRM/NSO Engineering Services Production Support, FBOD Service Level Agreement. Assumptions included:

- Platform Support at 2008 Rates increased 3% annually over a five year period
- Back up Support figures were increased by 50% over 2008 levels (backing out the fixed \$800 fee) then this figure was increased 3% annually over the five year period
- SQL Server cost increased 3% annually over the 2008 rate
- Data Center Hosting- CIBER assumed \$514 per square foot with a five square foot minimum per rack

CIBER can share assumptions with OIRM in order to ensure these estimates are accurate.

Applications running on HP-UX Blades				
Product	Discount Applied	Net License	Net Support	Grand Total
Oracle Tech Software	Washington State Pricing	\$ 847,224.90	\$ 186,389.48	
*Hardware/HP-UX/HW Software	WSCA Pricing	\$ 634,578.83	\$ 167,539.35	
Estimated OIRM App Support			\$ 594,840.41	
SAN, Software and Switch	WSCA Pricing	\$ 157,940.65	\$ 67,908.20	
Totals**		\$1,639,744.38	\$1,016,677.44	\$2,656,421.82

*The hardware cost reflects a credit of \$38,940 for elimination of the PeopleSoft Reporting DB Server (formerly PILCHUCK) and the EBS Reporting DB Server (formerly WHISTLER).

** Does not include sales tax.

Applications running on Linux				
Product	Discount %	Net License	Net Support	Grand Total
Oracle Tech Software	Washington State Pricing	\$1,924,500.60	\$ 423,390.13	
Hardware/Linux/HW Software	WSCA Pricing and Linux Bulk Discount	\$ 420,970.48	\$ 94,412.75	
Estimated OIRM App Support			\$ 494,435.34	
SAN, Software and Switch	WSCA Pricing	\$ 157,940.65	\$ 67,908.20	
Totals**		\$2,503,411.73	\$1,080,146.42	\$3,583,558.15

** Does not include sales tax.

6.2 SOFT COSTS

In consideration of other potential cost implications, CIBER would like to challenge King County to consider the following:

- Training cost for any additional skill sets for the Linux option
- The energy costs of running and cooling one solution versus the other
- The potential cost associated with outside assistance for Linux while the county matures its policies, procedures and skill sets associated with Linux

7 SUMMARY

In summary, CIBER has concluded its assessment of the necessary infrastructure for the ABT initiatives. The areas assessed in contrasting HP-UX versus Linux included:

- Business Requirements- Both infrastructures will meet the business requirements specified, hence, the scoring for this category is neutral
- Leverage Existing Investment- UNIX would enable the county to leverage at least one of the existing HP-UX Servers in the future state configuration. Existing Standards- Both operating systems are current standards for King County. Due to the option to use an existing investment in hardware, the scoring for this category favors UNIX.
- Oracle Assessment- Both operating systems will allow the county to utilize recommendations made by CIBER in this section. The scoring in this category is neutral.
- Install Base Representation- Although Linux is gaining momentum, the representative sample accounts in Public Sector still show a strong favoritism towards different flavors of UNIX, hence, the scoring for this category favors UNIX
- Budget
 - Hard costs- Scoring in this category favors UNIX

Based upon the assessment of this criteria, CIBER has concluded that HP-UX be recommended as the solution of choice for King County's deployment of countywide PeopleSoft HCM and Oracle eBusiness Financials.

Although both choices of operating system could meet King County's needs, the decision in large part was driven by budget directive. CIBER/ABT Program was given guidance by the King County Department of Executive Services, Finance Director at a Business Requirements meeting to be as cost effective as possible with the technology at or below current cost levels. The HP-UX Blade Center solution is more cost effective on a 5 year projection by \$1,200,632.79. CIBER assumed a 3% annual increase in support costs.

Five year cost for Infrastructure Options						
	Year 1		Year 2	Year 3	Year 4	Year 5
	One Time Purchase	Support	Support	Support	Support	Support
HP-UX Blades	\$1,639,744.38	\$1,016,677.44	\$1,047,177.76	\$1,078,593.10	\$1,110,950.89	\$1,144,279.42
Linux Blades	\$2,503,411.73	\$1,080,146.42	\$1,112,550.81	\$1,145,927.34	\$1,180,305.16	\$1,215,714.31
	Total Cost*					
HP-UX Blades	\$7,037,422.99					
Linux Blades	\$8,238,055.78					

* Does not include sales tax

8 RECOMMENDED FUTURE STATE HARDWARE CONFIGURATION

The table below reflects the servers proposed future state.

Server Role	#	Server Model	Processors* Speed	Memory (GB)	Other	Phase of Procurement
<i>PeopleSoft Production Environment</i>						
Database Server	1	BL870c	3P/6C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 2 February 2009
Application Servers	2	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	16 GB	Dual Gigabit to networks 2 x 146 GB internal disks	HW Procure 2 February 2009
WEB Servers	2	BL870c	1P/2C Itanium 1.6 GHz 18M Dual-Core cpus	16 GB	Dual Gigabit to networks 2 x 146 GB internal disks	HW Procure 2 February 2009
Report Database Server (Formerly PILCHUCK)	1	Integrity rx3600	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32GB		DECOM 1 January 2009
Report File Server (Windows 2003 Server)	1	Proliant BL460c	2P/8C Xeon 3.3 GHz Quad-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 2 February 2009
WEB Reporting Server	1	BL870c	1P/2C Itanium 1.6 GHz 18M Dual-Core cpus	8 GB	Dual Gigabit to networks 2 x 146 GB internal disks	HW Procure 2 February 2009
<i>PeopleSoft Non-Prod Environments Including Q&A, Dev., Demo, Training, etc.</i>						
Database Server	1	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 1 August 2008

Server Role	#	Server Model	Processors* Speed	Memory (GB)	Other	Phase of Procurement
Application/WEB Server	1	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks 2 x 146 GB internal disks	HW Procure 1 August 2008
Report File Server (Windows 2003 Server)	1	Proliant BL460c	2P/8C Xeon 3.3 GHz Quad-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 1 August 2008
WEB Reporting Server	1	BL870c	1P/2C Itanium 1.6 GHz 18M Dual-Core cpus	8 GB	Dual Gigabit to networks 2 x 146 GB internal disks	HW Procure 1 August 2008
<i>SOA Environments</i>						
BI & BPEL Production Servers	1	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 3 August 2010
BI & BPEL non-Production Server	1	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 2 February 2009
OBIEE Production Server	1	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 4 January 2012
Grid Control Production Server	1	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Dual Gigabit to networks Dual Fibre to SAN 2 x 146 GB internal disks	HW Procure 2 February 2009
<i>Oracle Production Environments</i>						
Database Server	1	Integrity 6600	6P/12C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Quad Gigabit connection to LAN Dual FC connection for SAN	HW Procure 3 August 2010

Server Role	#	Server Model	Processors* Speed	Memory (GB)	Other	Phase of Procurement
Application/Web Servers	2	BL870c	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus	16 GB	Quad Gigabit connection to LAN	HW Procure 3 August 2010
Report Database Server (Formerly WHISTLER)	1	RX3600	2P/4C Itanium 1.6 GHz 18M Dual-Core cpus			DECOM 2 November 2009
<i>Oracle Non Production Environments including QA, Dev, Demo, Test etc.</i>						
Database Server	1	BL870c	3P/6C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Quad Gigabit connection to LAN Dual FC for SAN	HW Procure 1 August 2008
Application/Web Server	1	BL870c	3P/6C Itanium 1.6 GHz 18M Dual-Core cpus	32 GB	Quad Gigabit connection to LAN	HW Procure 1 August 2008

CIBER assumed that a new SAN would be required. The estimated future state need was assessed at 10TB. The sizing by HP concluded a need for the following:

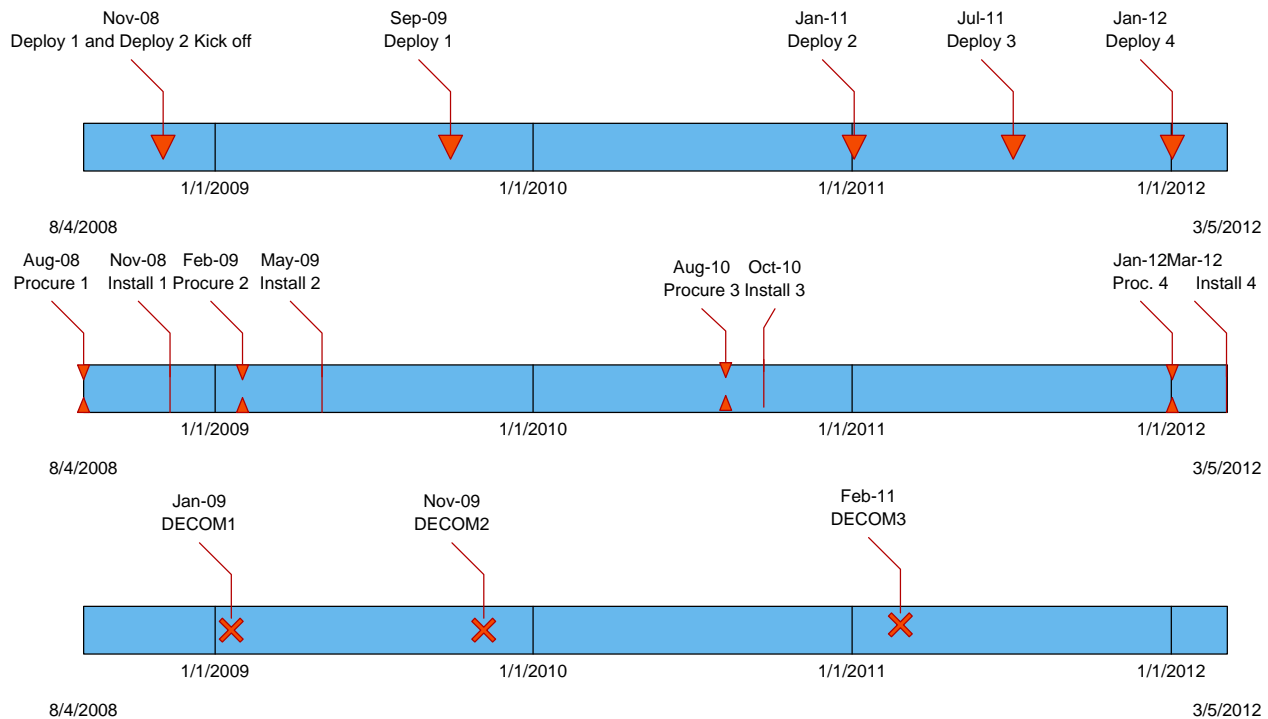
- EVA 4400 Storage
- 64 Port Storage Switch

The SAN would need to be procured in HW Procure 2 and installed by May of 2009.

In addition to the hardware equipment and servers specified above, the assumption was to leverage the existing RIGHTFAX servers and Storage Management Server for EVA4400 future state. If these servers are either not available or near the end of their useful life, CIBER could work with King County identify alternatives within the existing environment or procurement of new servers.

9 DECOMMISSION SCHEDULE

The milestones indicated below reflect the multiple rounds of deployment, the associated procurements of infrastructure and DB licensing and the schedule for making existing infrastructure available for redeployment or expiration. CIBER assumed a three month window is needed for procurement. The install dates listed below are dates that installations need to be completed by.



The table that follows reflects the key for each of the codes reflected in the graphic above:

Code	Definition	Comments
Deploy 1 and 2 Kick Off	Commencement of Deploy 1 and Deploy 2 defined below	November 2008
Deploy 1	Countywide go live on PeopleSoft HR, Benefits and Position Management	September 2009
Deploy 2	All agencies go live on Oracle EBS and Group 1 migrate to Biweekly Payroll	January 2011
Deploy 3	Go live for Group2 migrating to PeopleSoft Biweekly Payroll	July 2011
Deploy 4	Go live for Group 3 migrating to PeopleSoft Biweekly Payroll completing the countywide migration to PeopleSoft Payroll.	January 2012
HW Procure 1	Servers and licenses to be procured: PSFT Non Prod DB, PSFT Non Prod App/Web, PSFT Report File Server, PSFT Web Reporting Server, Oracle Non Prod DB, Oracle Non Prod	Procure August 2008 for November 2008 install

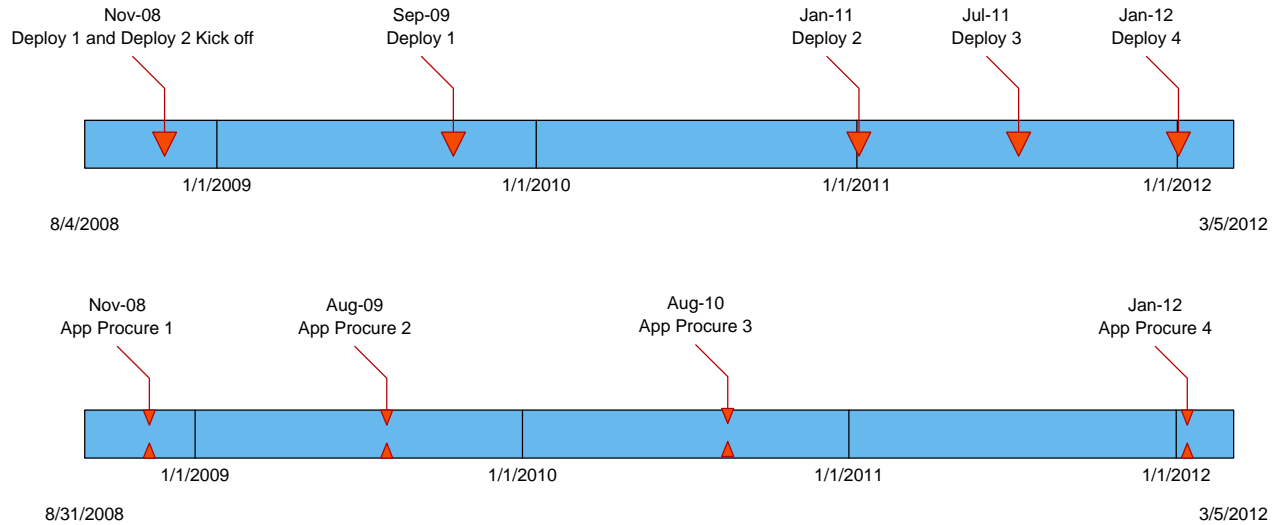


	App	
HW Procure 2	Servers and licenses to be procured: SOA (BPEL and BI Publisher) Non Production, PSFT Prod DB, PSFT Reporting/Archiving DB, PSFT Prod App 1, PSFT Prod App 2, PSFT Prod Web 1, PSFT Prod Web 2, PSFT Report File Server, PSFT Prod Web Reporting, Grid Control, EVA4400 SAN	Procure February 2009 for May 2009 install
HW Procure 3	Servers and licenses to be procured: Oracle Prod DB, Oracle Prod App 1, Oracle Prod App 2, SOA (BPEL and BI Publisher) Prod	August 2010 for October 2009 install
HW Procure 4	Servers and licenses to be procured: OBIEE	January 2012 for March 2012 install
Install 1	Installation of Hardware procured in HW Procure1 needs to be completely installed.	November 2008
Install 2	Installation of Hardware procured in HW Procure2 needs to be completely installed.	May 2009
Install 3	Installation of Hardware procured in HW Procure3 needs to be completely installed.	October 2010
Install 4	Installation of Hardware procured in HW Procure4 needs to be completely installed.	March 2012
DECOM1	PILCHUCK	January 2009 This server will become the PeopleSoft Reporting DB Server for the new environment.
DECOM2	THIELSEN, HOOD, WHISTLER, GARIBALDI, SHASTA, JACINTO, BUCKNER, LASSEN, EVA4000.	November 2009 WHISTLER will become the Oracle Reporting DB Server. HOOD, and SHASTA could be used for the Budgeting system deployment. EVA4000 may be redeployed as well.
DECOM3	OF30, OFA11, OFA12, OFA21, OFD10, OFD20, VA7410	February 2011 OFD10 and OFA11 will be used to keep the old IBIS available in read-only mode until sometime in 2012 when the data may be migrated to the new reporting repository. Available for redeployment or retirement

Please see Appendix B for cost by procurement phase for hardware, OS and support.

10 SOFTWARE PROCUREMENT SCHEDULE

The milestones indicated below reflect the multiple rounds of deployment and the associated procurements of software licensing and support needed. The App Procure date reflected below is intended to be Just in Time and as close to an Oracle fiscal quarter or year end as possible.



Code	Definition	Comments
Deploy 1 and 2 Kick Off	Commencement of Deploy 1 and Deploy 2 defined below	November 2008
Deploy 1	Countywide go live on PeopleSoft HR, Benefits and Position	September 2009
Deploy 2	All agencies live on Oracle EBS and Group 1 migrate to PeopleSoft Biweekly Payroll	January 2011
Deploy 3	Go Live for Group 2 migrating to PeopleSoft Biweekly Payroll	July 2011
Deploy 4	Go live for Group 3 migrating to PeopleSoft Bi-weekly Payroll completing countywide migration to PeopleSoft Payroll.	January 2012
App Procure 1	UPK Developer licenses and support	November 2008
App Procure 2	UPK Users (33%) license and support	August 2009
App Procure 3	UPK Users (67%) license and support, 100% of the license	August 2010



	and support for users of the following: Oracle EBS Financials, Advanced Collections, Procurement Intelligence, Purchasing, iSupplier Portal, Project Costing, Grants Management, Inventory Management and iProcurement.	
App Procure 4	Oracle EBS - Internal Controls Manager, PeopleSoft ePerformance, Enterprise Learning Management (ELM), OBIEE or equivalent reporting tool	January 2012

11 APPENDIX A: TECHNOLOGY ARCHITECTURE BUSINESS REQUIREMENTS



King County

ABT PROGRAM

Accountable Business Transformation

Business Requirements Matrix For Technology Architecture

May 5, 2008

Prepared by:
Marjorie Mills, ABT

Document Purpose

The purpose of this document is to describe the business requirements that define the needs for a technology architecture that will support the business practices and computer systems to be implemented by the Accountable Business Transformation (ABT) Program. During late spring 2008 (March-May) the ABT Program is focused in part on the development of a Detailed Implementation Plan (DIP). A Systems Integrator has been brought in to work with ABT staff and County stakeholders to develop an implementation plan with enough specificity to become a roadmap for the ABT implementation including defining the phasing strategy, schedule, resources and costs for the program. One important aspect of the DIP is the development of a technology architecture plan. Business requirements drive a number of aspects of the technology architecture. The attached matrix describes the proposed business requirements that have been reviewed by numerous business and technical people in a series of meetings. The matrix was revised and refined based on their feedback and help. The guiding principal was to look for a cost effective approach that minimizes risk of downtime or a loss of data while still keeping the costs as low as possible.

Background Summary

The vision of the Accountable Business Transformation (ABT) Program is:

“King County’s financial, human resource and budget management functions are fully integrated, efficient and effective, and enhance the county’s ability to provide essential services to its customers.”

Currently King County is operating two different financial and human resource and payroll systems. The two systems used for finance functions are IBIS and ARMS. IBIS is an Oracle Enterprise Business Suite (EBS) implementation which is currently running version 11. 5.10.2 on an Oracle 10g R2 database in an HP-UX 11.x environment. ARMS is a legacy mainframe financial system. For HR and Payroll functions, the two systems currently is use today are PeopleSoft and MSA, the legacy mainframe application. PeopleSoft was recently upgraded to version 8.9. The upgrade project acquired new hardware that was sized with future growth in mind for the ABT program though hardware sizing assumptions will be reviewed and confirmed during this planning effort.

To deliver on the ABT vision the ABT program will implement new business practices and implement a single set of business systems to all of King County. The project will:

- ✓ Transition the County to the Oracle Enterprise Business Suite (EBS version12) Financial System and to the PeopleSoft Human Resources/Payroll (version 9) system,
- ✓ Implement a new county wide budget application that will support capital and operating budget functions,
- ✓ Implement new business processes supported by the applications, as identified by the High Level Business Plan and High Level Business Design and the Detailed Implementation Plan, and
- ✓ Implement the appropriate technology architecture (hardware and software) to successfully support the business requirements of the County within the scope of the ABT program

An RFP selection process for a new Budget system is still in process and a recommendation for a new budget system is expected to be concluded in May.

The following people provided input into the process of developing the business requirements matrix:

Pete Anthony	FBOD
Stephen Bell	DJA - ITSDM
Mike Betschart	FBOD
Dale Brandenstein	KCIT – Systems Engineering
Samuel Cardenas	HRD
Diana Chism	KCIT System Engineering
Kerry Delaney	HRD
Ken Dutcher	KCIT – Enterprise Systems
Kay Edmiston	ABT
Michael Frawley	HRD
Kelly Furner	SO – Technology Manager
Lisa Gauthier	ABT
Ken Guy	FBOD
Duane Hill	ABT
Gary Hocking	DNRP - ITSDM
Randy Inouye	DCHS
Jim Keller	KCIT
Hugh Kim	KCSC
Roger Kirouac	DPH - ITSDM
Nancy Laswell	FBOD
Cindy Lee	FBOD
Tom McBroom	DDES - ITSDM
Caroline McShane	FBOD
Eric Polzin	ABT
Lisa Reinitz	KCIT – ADSS
Shannon Root	KCIT – Systems Engineering
Dana Spencer	HRD
Reid Swick	KCIT – Systems Engineering
Sharon Thompson	HRD
Jim Walsh	OMB
Wayne Watanabe	DOT - ITSDM
Anita Whitfield	HRD
Nancy Wickmark	DES – Director's Office

Approval Assumptions:

The ABT Program asks the following individuals acting as representative Business Owners for Finance, Human Resources and Budget to approve this document: *The ABT Business Requirements Matrix for the Technology Architecture*. This information will be used as input to subsequent work on the technology architecture plan to be done as part of the Detailed Implementation Plan.

It is understood that further work to be done on the Detailed Implementation Plan may result in changes to the proposed approach. It is also understood that the Detailed Implementation Plan has two specific deliverables, the *Reporting Strategy Plan* and the *Data Management Strategy Plan* that will provide a more comprehensive review and strategy of reporting and data archival than found in the matrix. Therefore ABT is not asking for a final approval in this document on the reporting and data archival approach.



Ken Guy, Director, Director, Finance & Business Operations Division 5-6-08
Date



Anita Whitfield, Director, Human Resources Division 5/5/08
Date



James Walsh, KCEO/OMB - Budget 5-6-08
Date

ABT Business Requirements Matrix for Technology Architecture

Category	Proposed Approach	Current Standards - PeopleSoft / MSA	Current Standards - Oracle EBS / ARMS
System Access Hours	Business users desire round the clock system access where at all feasible. Many organizations have staff working round the clock. Having a regular published outage window at night or on Sunday for backups and technical maintenance is acceptable.	System is available for use round the clock with the exception of a regularly scheduled weekly backup window (Sundays 1:30pm-4:30pm).	System is available for use round the clock with the exception of planned maintenance windows: nightly for about 3 hours (approximately 1AM-4AM).
Technical Support - Hardware and Systems Engineering support	Proposed continuing current practice of - 24x7 support for hardware - Maintenance agreement with hardware vendor for 4 hour response	KCIT currently provides: - 24x7 support for hardware Maintenance agreement with hardware vendor requires 4 hour response back (problem could take longer to resolve)	KCIT currently provides: - 24x7 support for hardware Maintenance agreement with hardware vendor requires 4 hour response back (problem could take longer to resolve)
Technical Support - Database	No change to current practice unless change is made to resource levels in support organizations (FBOD and KCIT)	DBAs provide coverage from 6am-6pm and do not provide after hours support. Resolution to issues wait until morning.	DBAs provide after hours support to resolve database related issues.
Application (Functional) Support	Recommend continuing the current practice of providing application and help desk support during normal business operations hours: 6am - 6pm Mon-Fri - PeopleSoft 8am - 5pm Mon-Fri - Oracle* <i>* Willing to revise these operation hours if business requirement to do so.</i> <i>This is not a technology architecture requirement and is included here for information only.</i> <i>There may be some interest in the ability for groups to pay to get after hours support. Also consider providing some 24hr and weekend support immediately after Go Live of new functionality.</i>	Multiple help desks are in place: - A customer support call center is in place for Benefits - 8:30 - 4:00 and 6am-6pm M-F in November - FBOD provides a help desk focused on technical issues 6am - 6pm M-F. - Payroll and Time/Labor questions are supported by the functional group during regular business hours, typically 8am-5pm. Support issues can be escalated via help desk system and routed to functional analysts who provide tier 2 or tier 3 support.	KCIT helpdesk receives calls and then emails the support group who then work directly with customers. Alternatively customers may email the support team directly. Help desk hours are currently 8am - 5pm during normal business operations (Monday - Friday);
Peak Usage Period	Anticipate similar peaks periods as found today. The schedule of peak periods is likely to change as new business practices aim for more efficient processes. Technology architecture needs to also consider effect of large batch processes once all KC is on PeopleSoft and on Oracle. Examples: Time Evaluation, Payroll processing W-2 Financial Close processes Annual budget loads Nightly batch interface loads/refreshes	4-week window for Open Enrollment during November. Hours of support and access elevated to 24x7 during this period. 2007 Open Enrollment saw approximately 2500 logins a day (less than 200 concurrent users/day). Payroll processing for bi-weekly: Takes place Mon-Friday the week after a payroll cutoff date. Monday of that week is the last day for managers to approve time and last day for HR updates; Tuesday is last day for timekeeper updates; Wed (Noon) is last day for benefits input; Wed-Friday payroll processing with payroll confirm run on Friday. The following week will have ACH on Wed and Payday on Thursday. Cycle repeated every two weeks.	Financial System peaks are during month end close processing which starts about 3 days prior to the end of each month. ARMS has huge runs at the end of the year for year-end closing processes. <i>[Business concerns raised about how long it takes to close is outside the scope of this document.]</i> <u>Budget preparation:</u> April-May, July-Oct, and again to load the annual budget at the end of Dec-early Jan.

ABT Business Requirements Matrix for Technology Architecture

Category	Proposed Approach	Current Standards - PeopleSoft / MSA	Current Standards - Oracle EBS / ARMS
Availability	<p>Architect to reduce single point of failure where feasible. Do not architect to expensive High Availability for guarantee of no down-time.</p> <p>Allow pre-planned outages for system maintenance windows or for system upgrades.</p> <p>King County Business Continuity plan is still in force. Mitigation procedures currently in place should be reviewed and reminders of those procedures included in ABT system training as a refresher.</p>	<p>24x7 Support to resolve hardware issues, uptime not guaranteed.</p> <p>During payroll processing periods the maximum tolerable down time will be no more than one day (12 hours);</p> <p>Business Continuity surveys reveal that most functions can tolerate 1 day of down time with minimal impact. Business continuity procedures are in place to handle any extended outages.</p>	<p>24x7 Support to resolve hardware and database issues, uptime not guaranteed.</p> <p>Business Continuity surveys reveal that most functions can tolerate 1 day of down time with minimal impact. Business continuity procedures are in place to handle any extended outages.</p>
Projected Number of Users	<p>ABT proposes to increase access and use of Oracle and Peoplesoft. For Oracle EBS we expect access to be needed for all workflow approvers (most managers/supervisors), Procurement is an example of a function that would have more wide-spread access for online requisitioning and approvals. Managers and department finance managers should have access to Oracle EBS to review the status of their budget online.</p> <p>Additional groups of employees will begin using the PeopleSoft Time and Labor.</p> <p>Self-service functions in PeopleSoft will be given to all employees. Currently, there are approximately 16,350 employees in the County.</p> <p>Expect some latent demand as users move off side-systems and current reporting solutions to new systems and reporting solutions.</p> <p><i>Work is currently being done to estimate county-wide user counts for hardware sizing. Additional effort will drive to more granular counts by department. Data from the Cost Benefit Comparison and surveys for ABT training will be helpful. SMEs may be consulted for confirming department user count</i></p>	<p>KC owns licenses to most PeopleSoft modules for all employees and some self service features are implemented today. Open enrollment is implemented county-wide today. Time and Labor is used by employees for departments that are in Peoplesoft for payroll.</p>	<p>Limited licenses to Oracle restrict use of the system today. Approximately 38 users are licensed to access Oracle Financials and approximately 89 to access Purchasing functions in IBIS. Most reports and queries are done outside of the system.</p>
External Access	<p>Continue practice to allow employees to access PeopleSoft self-service from home (secured by reverse proxy or equivalent). And access to core modules as needed by SSL VPN. Understand that KC will be increasing use of telecommuting in the future expanding the need for staff to access both Oracle EBS and PeopleSoft from home.</p> <p>In phase two of ABT some vendors may access iSupplier functions externally. Recruitment module will be available to external job candidates.</p>	<p>PeopleSoft self-service is accessible by employees from home. Other modules only accessible via SSL VPN.</p> <p>Limited use of eRecruit today.</p>	<p>Access by core users available only through SSL VPN.</p>

ABT Business Requirements Matrix for Technology Architecture

Category	Proposed Approach	Current Standards - PeopleSoft / MSA	Current Standards - Oracle EBS / ARMS
<p>Tolerance for Loss of Data in the Event of Hardware Failure (Backup and Recovery)</p>	<p>The risk of data loss is reasonably low but it could happen. It's worth noting that both PeopleSoft and Oracle IBIS systems have been extremely stable and KC has never lost data from a hardware failure. With that in mind and to keep costs reasonable, the recommendation is to continue the practice of:</p> <ul style="list-style-type: none"> - Full backup done weekly - Nightly differential backups including backups of archive logs - Backup tapes moved off-site at 1pm daily <p>It is possible to lose data if a restore is required from the prior day's backup. To lessen this risk, consider expanding frequency of copying log files and database archive logs to secondary storage to improve ability to restore data to within less than an hour of the point of failure.</p>	<p>Weekly full backup. Nightly differential backup. Backups sent off-site at 1pm daily.</p>	<p>Weekly full backup. Nightly differential backup. Backups sent off-site at 1pm daily.</p>
<p>Reporting</p>	<ul style="list-style-type: none"> - Increase the number of real-time reports available from within Oracle and PeopleSoft (standard and custom reports). Increased access to the systems will make this a viable option for a set of high priority reports. Leverage ability to export data to Excel from system reports. - Continue the practice of creating a copy of production databases nightly for reporting purposes. This improves production performance and 12hour old data is still reasonable for most reporting. - Reporting is a significant component of the Budget System project. - <i>ABT is still evaluating reporting tools and a more detailed Reporting Strategy document is being developed as part of the DIP.</i> 	<p>A reporting database instance is refreshed from production on a nightly basis. The reporting database is available for use from 6am-6pm during normal operations.</p> <ul style="list-style-type: none"> - Archive reporting available through production login - Web reporting goes against reporting database - SQRs used against reporting database and production 	<p>A reporting database instance is refreshed from production on a nightly basis. The reporting database is available for use from 6am-6pm during normal operations.</p> <ul style="list-style-type: none"> - Business Objects is used by staff to extract data and run their own reports. Business Object Universes have predefined data elements for reporting. - Web reports are generated monthly and posted to the web site where they can be accessed. - "IBIS Detail Transactions - Multiple Cost Centers and projects" web reports reflect YTD activity. - InfoPac is another reporting solution that bundles monthly reporting used by numerous users.
<p>Data Archival, Purge and Data Retention</p> <p>Purpose of data archival is to improve response time in production system.</p>	<p>Propose a three tier approach to data archival:</p> <ul style="list-style-type: none"> - <u>Production</u> - for data needed to be accessed regularly and still needing to be available for updates - <u>Archive System</u> - this would be a copy of the Oracle and PeopleSoft system only security access would be limited to read-only and the data populated into the system would be older. This data is still needed for research. - <u>Off-line Storage</u> - to be held in another media (hard copy, microfiche, etc.) until retention period expiration has been reached. <p><u>In Phase One</u> of ABT - data conversion would be the process that would move data into Prod or Archive.</p> <p><u>In Phase Two</u> (year 4-5) of ABT:</p> <p>The legacy decommissioning process in years 4-5 would further address moving old data still needing to be retained into off-line storage.</p> <p>- <i>ABT is developing a data management strategy as part of DIP that will include additional information about a data archival strategy.</i></p>	<p>Except for Time & Labor data, the data in PeopleSoft has not been archived since 1999.</p> <ul style="list-style-type: none"> - Time & Labor data is as of 2003 or 2004 with the older data (1999-2003) sitting in an archive database that is accessible as a choice when logging into PeopleSoft. - All other data in PeopleSoft goes back to 1999. - Some archived data is also accessible through HARC database. 	<p>Data has not been archived since 1995. There are concerns about the size of the database as it relates to production system performance.</p>

12 APPENDIX B: HARDWARE COST BY PHASE OF PROCUREMENT

Appendix B - Hardware Cost by Phase of Procurement

Server	Procure Phase	Application Management Fees	Oracle License	Oracle Support	HP HW/OS	HP Support	Total	Amount Per Proc.
PSFT Non Prod DB	Phase 1	\$ 69,366.26	\$ 50,263.20	\$ 11,057.90	\$ 22,052.00	\$ 6,354.00	\$ 159,093.36	
PSFT Non Prod App/Web	Phase 1	\$ 16,667.28	\$ 5,799.60	\$ 1,275.91	\$ 22,052.00	\$ 6,354.00	\$ 52,148.79	
PSFT Non Prod Report File Server	Phase 1	\$ 9,574.20			\$ 7,758.00	\$ 6,470.00	\$ 23,802.20	
PSFT Non Prod Web Reporting Server	Phase 1	\$ 16,667.28			\$ 12,546.00	\$ 3,989.00	\$ 33,202.28	
ORCL Non Prod DB	Phase 1	\$ 37,919.42	\$ 75,394.80	\$ 16,586.86	\$ 22,052.00	\$ 8,719.00	\$ 160,672.07	
ORCL Non Prod App/Web	Phase 1	\$ 19,012.98	\$ 65,245.50	\$ 14,354.01	\$ 22,052.00	\$ 8,719.00	\$ 129,383.49	
Chassis	Phase 1				\$ 99,000.00	\$ 18,627.81	\$ 117,627.81	
Square Footage Fee	Phase 1	\$ 9,137.78					\$ 9,137.78	
Unresolved HP charge	Phase 1				\$ 22,651.83		\$ 22,651.83	\$ 707,719.60
PSFT Prod DB	Phase 2	\$ 27,603.40	\$ 89,893.80	\$ 19,776.64	\$ 27,113.00	\$ 8,719.00	\$ 173,105.84	
PSFT Prod App Servers (2)	Phase 2	\$ 39,983.45	\$ 5,799.60	\$ 1,275.91	\$ 38,042.00	\$ 12,708.00	\$ 97,808.96	
PSFT Prod Web Servers (2)	Phase 2	\$ 38,792.00	\$ 2,899.80	\$ 637.96	\$ 26,706.00	\$ 7,978.00	\$ 77,013.76	
PSFT Report DB Server (Formerly PILCHUCK)	Phase 2	\$ 5,260.13	\$ -	\$ -	\$ -	\$ -	\$ 5,260.13	
PSFT Prod Report File Server	Phase 2	\$ 9,133.60			\$ 7,758.00	\$ 6,470.00	\$ 23,361.60	
PSFT Prod Web Reporting Server	Phase 2	\$ 19,767.28			\$ 12,546.00	\$ 3,989.00	\$ 36,302.28	
SOA (BI & BPEL) Non Prod	Phase 2	\$ 17,500.00	\$ 130,491.00	\$ 28,708.02	\$ 22,052.00	\$ 6,354.00	\$ 205,105.02	
Grid Control Prod	Phase 2	\$ 20,600.00			\$ 22,052.00	\$ 6,354.00	\$ 49,006.00	
SAN	Phase 2	\$ 9,000.00			\$ 157,940.65	\$ 67,908.20	\$ 234,848.85	
Chassis	Phase 2				\$ 66,000.00	\$ 12,418.54	\$ 78,418.54	
Square Footage Fee	Phase 2	\$ 9,137.78					\$ 9,137.78	\$ 989,368.75
SOA (BI & BPEL) Prod	Phase 3	\$ 20,600.00	\$ 130,491.00	\$ 28,708.02	\$ 22,052.00	\$ 6,354.00	\$ 208,205.02	
ORCL Prod DB	Phase 3	\$ 33,654.33	\$ 150,789.60	\$ 33,173.71	\$ 100,000.00	\$ 17,900.00	\$ 335,517.64	
ORCL Prod App/Web Servers (2)	Phase 3	\$ 44,677.39	\$ 86,994.00	\$ 19,138.68	\$ 38,042.00	\$ 12,708.00	\$ 201,560.07	
ORCL Report DB Server (Formerly WHISTLER)	Phase 3	\$ 5,260.00	\$ -	\$ -	\$ -	\$ -	\$ 5,260.00	
Square Footage Fee	Phase 3	\$ 9,137.78					\$ 9,137.78	\$ 759,680.50
OBIEE Prod	Phase 4	\$ 20,600.00	\$ 53,163.00	\$ 11,695.86	\$ 22,052.00	\$ 6,354.00	\$ 113,864.86	\$ 113,864.86
Rightfax	N/A	\$ 10,032.85					\$ 10,032.85	
Rightfaxdev	N/A	\$ 6,750.00					\$ 6,750.00	
fbod-bkupreport	N/A	\$ 7,343.88					\$ 7,343.88	
fbod-devreport	N/A	\$ 4,218.82					\$ 4,218.82	
fbod-main	N/A	\$ 19,579.66					\$ 19,579.66	
fbod-procdev	N/A	\$ 403.99					\$ 403.99	
fbod-prodintra	N/A	\$ 853.50					\$ 853.50	
fbod-prodreport	N/A	\$ 3,693.28					\$ 3,693.28	
fbod-tape1	N/A	\$ 1,107.07					\$ 1,107.07	
fbod-ibisbatch	N/A	\$ 942.27					\$ 942.27	
Eagle	N/A	\$ 30,862.80					\$ 30,862.80	\$ 85,788.11
		\$ 594,840.41	\$ 847,224.90	\$ 186,389.48	\$ 792,519.48	\$ 235,447.55	\$ 2,656,421.82	\$ 2,656,421.82