



**King County**

**ABT PROGRAM**

Accountable Business Transformation

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## ABT Program

# Interfacing Systems Strategy Plan

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June, 2008

# Revision History

<b>Version</b>	<b>Prepared by</b>	<b>Date</b>	<b>Reviewed by</b>	<b>Approved by</b>	<b>Note</b>
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# 1.0 Introduction

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## 1.1 Executive Summary

The primary goal of ABT Program is to consolidate the functions of Human Capital Management (HCM), Financials, and Budget into a common platform by implementing PeopleSoft 9, Oracle eBusiness Suite Release 12 modules and a new Budget system.

The integration strategy plan evaluates the functionality provided within the various core legacy systems and side systems and makes a recommendation for switching to PeopleSoft 9 and Oracle EBS for Human Capital Management (HCM) and Financials respectively. The plan recommends the legacy systems that will be retired or retained and integrated.

The plan then addresses the integration requirements between Oracle EBS or PeopleSoft 9 and the side systems that are retained. The plan also recommends the approach that is taken for achieving the integration between Oracle EBS or PeopleSoft 9 and the side systems. While the New Budget System is yet to be identified, a place holder for Inbound and Outbound Interfaces between Oracle EBS and the New Budget System has been listed.

## 1.2 Objectives

The objectives of this document are two fold. This first is to provide a structure of how interfaces will be configured and rolled out Countywide. The second is to provide a high level overview of the currently identified interfaces for the ABT implementation and the recommendations of how the interfaces should be handled. This includes the platform and the development tools that will be necessary.

In general, the strategy is an initial guide on the following areas and it will evolve over time during the ABT implementation:

- Review of current technology landscape
- Side system retirement
- Future technology landscape
- Phasing ( project timelines)
- Assessment of Integration solution Center and Standards
- Interface approach
  - Identification of interfaces
  - Tools to be used.
  - Interface design and documentation
  - Unit and Integration testing
  - Code promotion and Version control
  - Approvals
- Roles and responsibilities
- Maintenance and support.
  - Knowledge transfer from consultants for custom programs developed.
  - Retooling of King County technical staff of maintaining the custom programs and to undertake new development using these technologies.

Data Archival, Project and Operations Resources, and Testing will be further discussed in the respective strategy plans.

### **1.3 Data Integration Strategy:**

The detailed implementation plan reviewed the functionality within the various core legacy systems and side systems - that are currently used by various departments based on reports from the High Level Business Plan and High Level Business Design, to determine if the functionality within Oracle EBS or PeopleSoft 9 can replace the functionality offered within these legacy systems.

A recommendation is then made to retire or retain a certain legacy system. If the recommendation is to retain, an integration requirement is identified between the Oracle EBS or PeopleSoft 9 and the legacy system.

An Integration approach is recommended that offers the framework for achieving the objectives of integrating one system with another. The Interface approach recommends the tool to be used, the business rules that need to be built, exception handling and system testing among other aspects of Integration.

The first phase of Implementation is Discovery where Fit/Gap will be performed across King County Department Processes. Fit/Gap and Business Process Re-design workshops will identify gaps which will flow into a channel for system modifications, Interfaces, and custom reporting which will be costed and approved based on business dependency and justification and then planned for design, development and testing activities. These activities will include department resources where necessary.

### **1.4 Summary of Recommendations:**

#### **1.4.1 Retirement Systems**

*Core Legacy systems* that are recommended to be retired are POL, MSA, ARMS, AIRS, BUC, IVIS, TRH, and Budget Systems PONS, CIP, and Public Health's. The functionality within these systems is offered within Oracle EBS or PeopleSoft 9.

*Side System Retirement Categories* that are recommended for retirement are listed below. These categories represent functionality that is offered within the PeopleSoft and Oracle EBS beyond the obvious functions of Human Resources, Payroll and General Ledger. A more detailed analysis will be done during the implementation phase to determine if any of the below mentioned side systems needs to be retained.

- Leave Tracking
- Training Tracking
- Recruitment
- Position Tracking
- Competency Tracking
- Performance Tracking
- Salary/Compensation Tracking
- Labor Grievance and Disciplinary Tracking
- Some Cash Management Systems
- Payables System
- Receivables Systems
- Asset Management

- Some Inventory Management Systems
- Grants Accounting
- Purchasing and Procurement Systems

### 1.4.2 Integration Approach

The Integration approach that is recommended below offers a broad framework or approach that will be taken by the implementation team for integration of various software systems that remain and have a need to be integrated.

The Implementation team, consisting of ABT direct, various department specialists, and consultant resources, will team to provide detailed design documents that capture the business rules, data transformation, column mapping and will provide details on exception handling and communications of those errors. The document will also provide details on maintenance and how to migrate the interface to different databases.

BPEL Process Manager (Business Process Executions Language) is the recommended integration tool for developing these interfaces. BPEL significantly improves the integration platform by providing a relatively easy and straightforward way to compose several services into new composite services called BPEL business processes.

Any interfaces that currently exist in IBIS and PeopleSoft 8.9 will be enhanced to work with Oracle EBS and PeopleSoft 9. Cost benefit analysis will be done to determine cost effectiveness of enhancing the current interface versus rewriting a given interface using BPEL tool.

The implementation team will develop the interface program and perform Unit Test, Systems Integration Test and User Acceptance Test to determine the results against the business requirements.

Approval process is built into each stage of the integration process.

### 1.4.3 Differentiating between Interfaces & Reporting

It is important to differentiate between interfaces and reports although both involve the flow of data. The importance lies in that interfaces requires a very different set of requirements to build from reports and vice versa. Additionally, reports are geared towards person usage, viewing and analysis, whereas interfaces are connections between systems. In general, the differences can be summarized by the following definitions:

- **Interface** - automated inbound and/or outbound flow of data and transactions from/to the application to/from another computerized system for processing.
- **Report** – manual and automated outbound flow of data from the application to a recipient for further handling involving person usage such as analysis, viewing and statistical calculations.

## 1.5 Assumptions

This assessment was based on the following assumptions.

Oracle Corporation's recent acquisition of various companies has resulted in a varied mix of Integration tools. The tools recommended in this document are based on the current Integration tool set that is offered by Oracle Corporation.

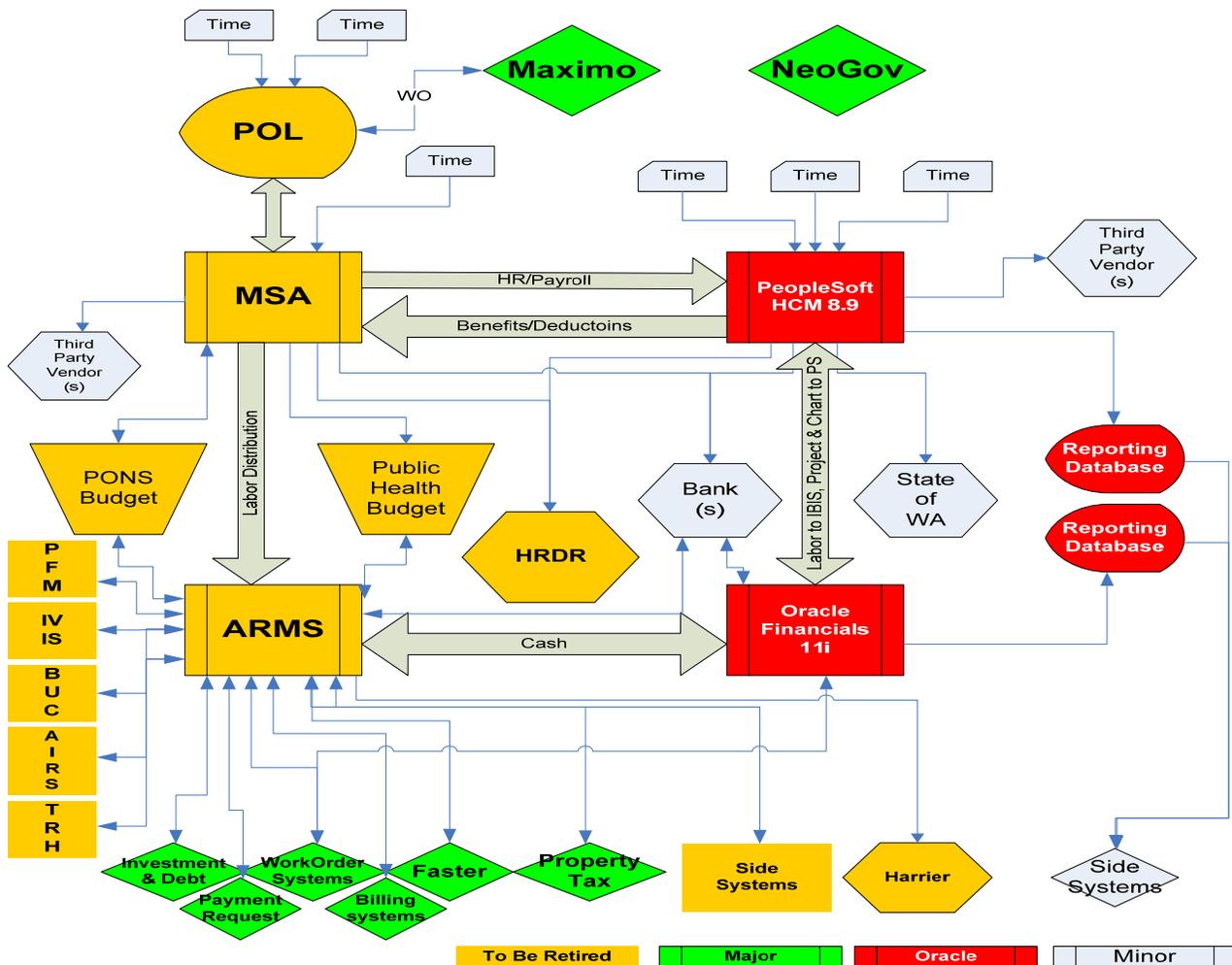
Assessment of various side systems is based on the meetings with the ABT team and narratives provided in the department side system matrix and legacy interface list provided by OIRM. As such, recommendation for retiring or retaining a particular side system is based on information provided during these interactions.

Departmental representatives with knowledge of Side System functionality and technology will be available during mapping analysis, development and testing of integration points.

## 2.0 Current Technology Landscape

Two Financial and two HR/Payroll systems and many support systems and varied technologies comprise the current landscape and its growing complexity, and support expense. Below is a diagram of the major systems and interfaces that currently exist at King County:

**King County – HCM/Financial System Landscape - Current**



Integration Methods in the current technology landscape include mainly batch FTP processes. An integration technology solution standard has not been established for this set of tools.

Current Interface standards are primarily based on Mainframe formatting requirements, and batch processing.

### 3.0 Legacy System Retirement

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For the estimation part of the DIP the assumption has been made that side systems that function in the following categories will be replaced by delivered functionality in the core systems currently installed such as PeopleSoft HCM, Oracle Financials EBS, and NeoGov or to be installed such as the New Budget System.

#### **3.1 Core Systems**

This list of Core Systems will be retired and rolled into the new core systems:

Legacy Core System	Replaced by Functionality in New Core System
POL	PeopleSoft Time and Labor. All will feed the central Time repository for final validation in PeopleSoft before Payroll is calculated. Corrections to Account coding will occur in PeopleSoft and/or the source system.
MSA	PeopleSoft Workforce Administration and Bi-Weekly Payroll
ARMS	Oracle General Ledger and Project/Grants
ADPICS	Oracle Procurement
AIRS	Oracle Receivables
BUC	Oracle Accounts Payable
IVIS	Oracle Fixed Assets
TRH	Oracle Cash Management
Essbase/PONS	New Budget System
CIP	New Budget System
Health Budget System	New Budget System
IBIS	Oracle General Ledger and Project/Grants

#### **3.2 Side Systems**

This list of Side Systems by Category is likely to be retired and rolled into the new core systems. Each retirement will be decided on a case by case basis:

Side System Category	Application	Replaced by Core Functionality
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Side System Category	Application	Replaced by Core Functionality
Leave Tracking	HCM	PeopleSoft Leaves Administration
Training Tracking	HCM	PeopleSoft Training Administration and/or Enterprise Learning Management (ELM)
Recruitment	HCM	NeoGov in the short term and PeopleSoft Recruitment Administration will be evaluated for the possible the long term solution
Position Tracking	HCM	PeopleSoft Position Management
Competency Tracking	HCM	PeopleSoft ePerformance
Performance Tracking	HCM	PeopleSoft ePerformance
Salary/Compensation Tracking	HCM	PeopleSoft eCompensation
Labor Grievance and Disciplinary Tracking	HCM	PeopleSoft Labor Administration
Accounting Systems	EBS	Oracle General Ledger and Oracle Receivables Modules within EBS Release 12. Billing and related cash transactions are recorded in Receivables to track collections and aging; direct cash receipts can be entered in Receivables or General Ledger, and all cash transactions are reconciled in Cash Management as part of the bank statement reconciliation process.
Payables System	EBS	Oracle Payables. Supplier invoices, prepayments and employee expense reports are entered and matched to purchase orders, as needed, to track expenditures and payments. Payments are reconciled in Cash Management as part of the bank statement reconciliation process.
Receivables Systems	EBS	Replaced by a combination of Oracle EBS modules <ul style="list-style-type: none"> <li>- Oracle Receivables</li> <li>- Oracle Cash Management</li> </ul> Billing and related cash transactions are recorded in Receivables to track collections and aging. All cash transactions are reconciled in Cash Management as part of the bank statement reconciliation process.
Asset Management	EBS	Oracle Fixed Assets. Purchased and constructed assets and construction in process transactions are recorded and tracked in Fixed Assets, including the related depreciation on the assets, providing the appropriate accounting to meet reporting requirements. Stewardship items that fall below the capitalization threshold can be tracked as well.
Inventory Management Systems	EBS	Oracle Inventory. Inventory on hand and related costs, as well as issues from inventory are tracked and accounted for as needed.
Grants Accounting	EBS	Oracle Projects and Grants. Grants, sponsored projects, capital projects and indirect project activities and costs are all tracked in Grants Accounting, providing the needed detail to costs, including by activity, and the ability to meet internal and external reporting needs from one source.
Purchasing and Procurement Systems	EBS	Oracle Purchasing. Procurement activities, including encumbering of budgeted funds, are tracked in one system, with the online approvals of the purchasing activities.

Note: For a list of Side systems that are recommended for retirement, please refer to “King County EBS and HCM Technical Inventory.xls” (‘Side System Retirement tab’) - Appendix A

Side systems, that do not fall into the categories above, will continue to exist and be maintained by the departments. Part of this maintenance will be to redevelop any data flow in/out of that side

system to/from the core systems. Standard integration points and formats will be created to leverage the ABT integration effort. Examples include, standard transaction formats for Time Capture, General Ledger or Project feeds and standard formats for Valid Account Value or Employee ID/Name downloads. Direct access to the nightly copy of the transaction databases will be available.

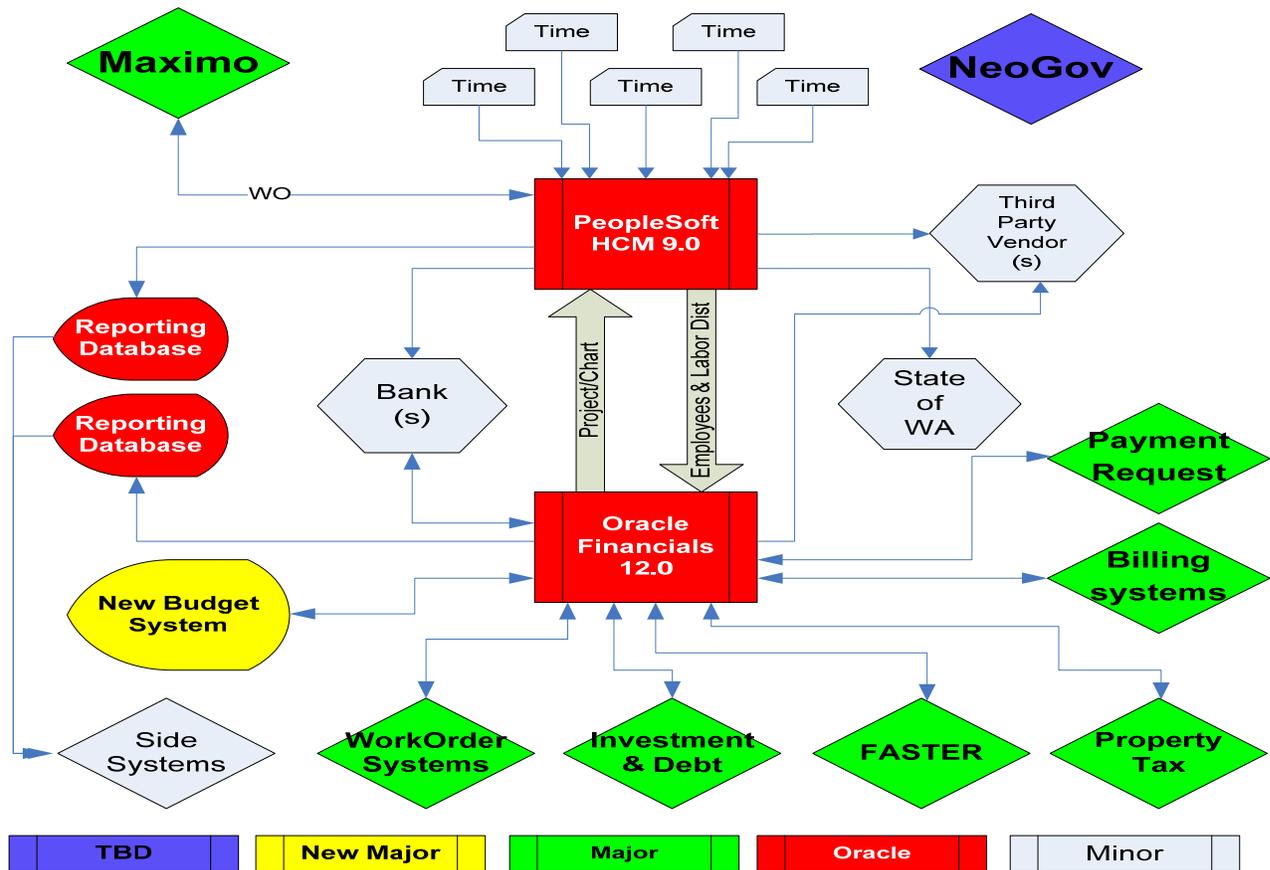
In the majority of cases, inbound transactions will be required to be pre-edited before being made available to the core systems for upload.

Data conversion and decommissioning of obsolete systems will be discussed in the Data Management Strategy.

## 4.0 Future Technology Landscape

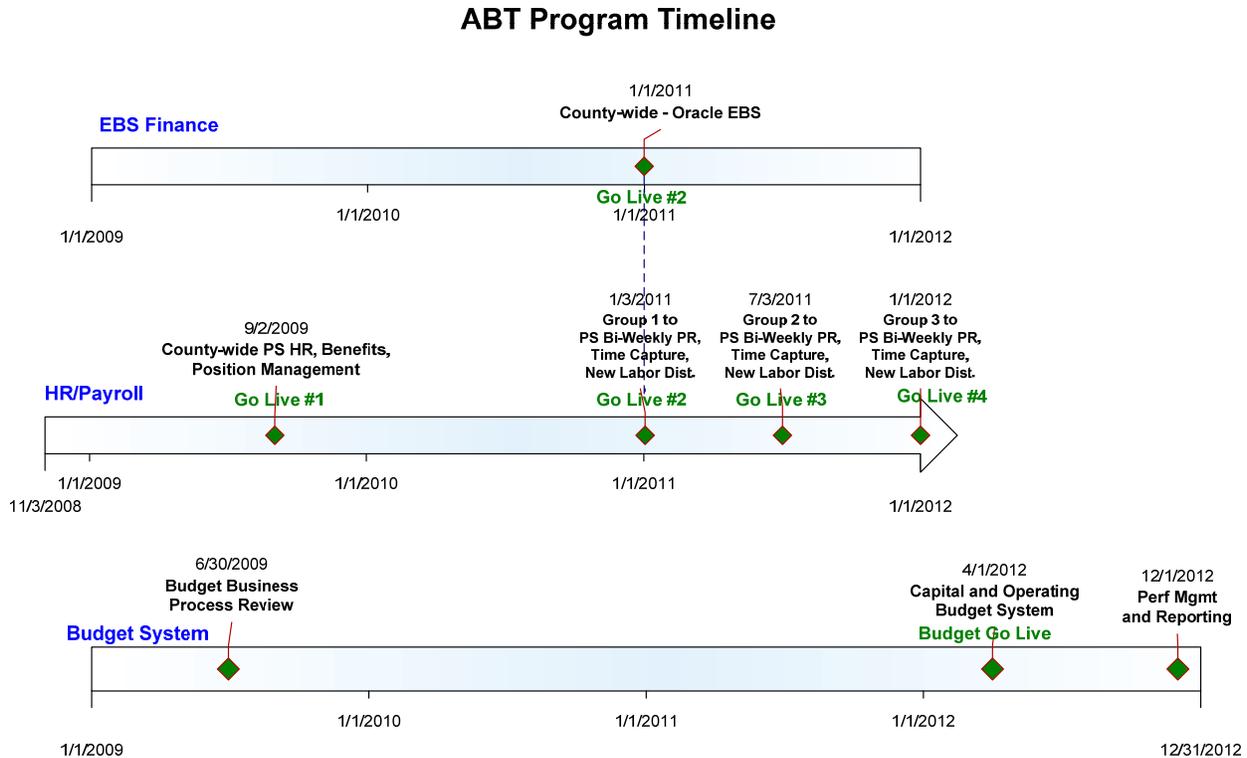
This diagram shows the some of the major interfaces that will exist when the ABT Program is complete for Human Capital and Financial Systems.

King County – HCM/Financial System Landscape - Future



## 5.0 Phasing

The following diagram shows the major phases of ABT's first Three Years Rollout. It shows:



- HR and Position Management will rollout first for all King County Employees within PeopleSoft. Side systems supporting these functions may be retired or interfaced at that time. A **temporary** interface will be built to update MSA with the HR and Position Management data changes so Semi-Monthly Payroll can continue.
- The full rollout of Financials for the entire County. Again, side systems supporting these functions may be retired or interfaced at that time. The **temporary** ARMS to EBS interface will be built to pass Labor Costs to Projects until all employees are paid by PeopleSoft.
- The rollout of multiple Payroll implementations by selected departments in groups.
- At the beginning of the Implementation, a discovery phase will be held for all departments to gather requirements and perform a Fit/Gap analysis of the new HCM and Financial Systems. Interfaces and Side Systems will be included in this analysis.
- The ABT Program is planning the rollout of possible new functionality, such as Leave Administration, ePerformance, and Enterprise Learning Management, in years four and five. More Side Systems may be retired or interfaced at that time.

Reference the Transition Strategy Plan and the interface lists in this document for more details on phasing and temporary interfaces.

## 6.0 Integration Approach

King County has complex business processes that need to integrate seamlessly in order to function and deliver as intended. The complexity is further magnified by the fact that these software systems are on different technology platforms and different databases.

The Integration approach outlines the broad framework or approach that will be taken by the implementation team for integration of various software systems that are currently used by King County and will be used in future.

The approach that the implementation team will take follows the outlined steps below.

- Integration requirements between various software systems. (covered in detail below section 7.1)
  - Classifying Interfaces into different types
  - Identification of Interfaces.
- Integration tools that will be used or are recommended to be used. (covered in detail below section 7.2)
  - Integration using PeopleSoft Integration tools
  - Integration using Oracle E-Business Integration tools
- Interface design (covered in detail below section 7.3)
  - Design documents to capture the business rules, data transformation, column mapping and will provide details on exception handling and communications of those errors. The document will also provide details on maintenance and how to migrate the interface to different instances
- Development of each interface
- Testing and validation of each interface. (covered in detail below section 7.4)
  - Unit Test, Systems Integration Test and User Acceptance Test are done against the business requirements.
- Approvals: (covered in detail below section 7.6)
  - Each Interface is approved based on testing and validation in order to promote the interface to the production system.

## 6.1 Integration Requirements

Thus far, the Assessment phase has identified several integration requirements - though a comprehensive list of all the interfaces that will be required can only be provided after Fit/Gap sessions undertaken during the implementation phase - the integration requirements seem to fall into two broad categories and are being classified into the below.

- **Application to Application integration (A2A)**

- Integration requirements between Oracle EBS and PeopleSoft and any other software systems that are owned and operated by King County.

*Core:* These interfaces link PeopleSoft HCM to Oracle EBS modules. These two systems need to be highly integrated using real time integration methods in many cases:

- Employee changes such as a new hire should be immediately available to be added to the list of valid employees that can change to a project/grant.
- Chart of Account and Project/Grant values need to be immediately available in the PeopleSoft Time and Labor module so employees can charge their time to the correct accounting string without delaying the payroll process.
- Payroll transactions to Financials.

*Internal:* These interfaces link PeopleSoft and EBS applications to other major and minor King County applications. These interfaces exist to support the multi-phased roll-out of functionalities and/or modules within PeopleSoft or EBS while maintaining County systems in production to support other required functionalities. A few examples are,

- Work order information between Oracle and the work order systems that are used by various departments.

- **External Interfaces - Business to Business (B2B)**

- Integration requirement between software applications that are owned / operated by King County and Third Party software vendors who provide services.

*External:* These interfaces link PeopleSoft or EBS applications to non-Oracle applications. These entities may include state, federal, or other 3<sup>rd</sup> party vendors including interfaces to External entities such as Banks, Benefit Vendors, and Government Agencies. A few examples are

- Vendor Payments (ACH) can be made using Direct Deposits (ACH) in the vendor banks, this requires that a file be generated as per the bank's requirement to be sent periodically or on demand.
- Bank statements can be downloaded into Oracle bank reconciliation purposes.

### 6.1.1 Core Interfaces - Application to Application (AtoA)

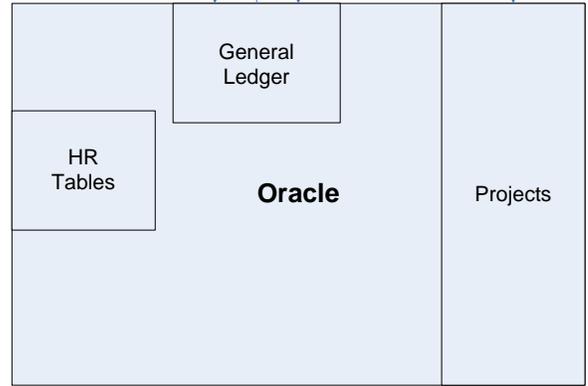
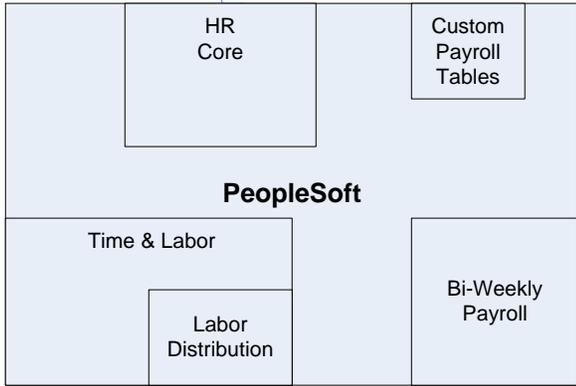
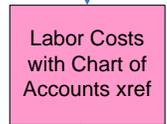
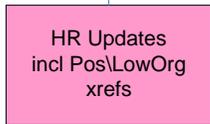
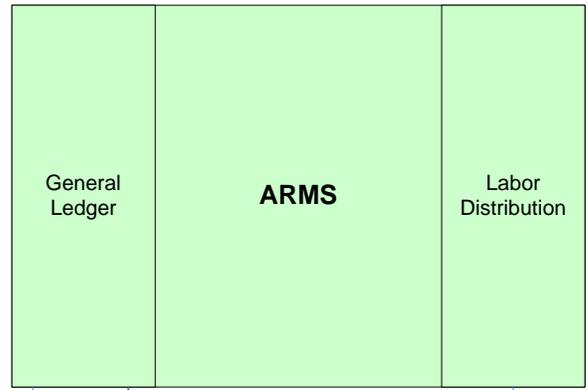
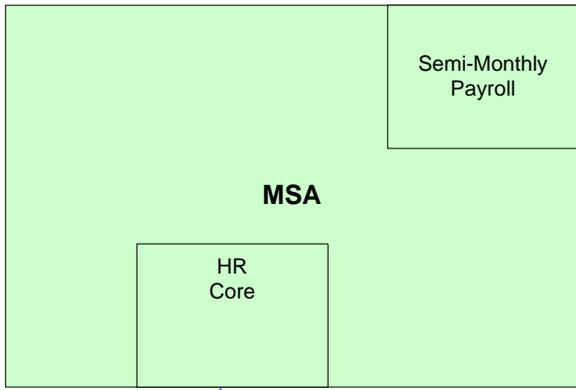
This section covers the currently identified list of interfaces that are planned to be developed or enhanced to integrate PeopleSoft Human Capital Management and Oracle Enterprise Business Solutions.

The full list of interfaces will be identified during the Fit-Gap and discovery phase of the implementation. The ABT team assumes a 30 percent contingency that is built into the project plan.

Below is the list of identified Core Interfaces that need to be implemented:

Source System	Target System	Purpose	Mode(s) / Frequency	Effort	Comments
PeopleSoft HCM	Oracle EBS	Provide List of Employees and Position for Financials, Project/Grants, and Budget	Real time	Med	Allows for the reporting of who has charged time to a project and ability to limit which employees that can charge to a project.
PeopleSoft HCM	Oracle EBS	Provide Distributed Labor Costs to Project/Grants	Bi-Weekly	High	This detailed data may be summarized and enhanced before being moved
PeopleSoft HCM	MSA	Provide HR data to support Semi-Monthly Payroll processing	Daily	High	This <b>temporary</b> Interface will run until all employees are paid Bi-Weekly in PeopleSoft
Oracle EBS	PeopleSoft HCM	Provide List of Valid Account String Values to Time and Labor	Real time	High	Oracle and PS do effective dating and table set sharing much differently
Oracle EBS	PeopleSoft HCM	Provide Project/Grant Rules to be enforced during Time Capture	Real time	High	This requires a modification in PeopleSoft Time and Labor.
ARMS	Oracle EBS	Labor Distribution for Agencies on EBS but still on POL/MSA	Semi-Monthly	High	Use Conversion Rules and Cross-walk to perform this <b>temporary</b> interface will run until all employees are paid Bi-Weekly in PeopleSoft

Identified **Temporary** Interfaces are shown in the diagram below:



## 6.1.2 Major Internal Interfaces Application to Application (AtoA)

This section covers the currently identified list of interfaces existing in ABT team documentation. More interfaces may be identified during the Fit-Gap and can be added later following future discussions.

Below is the list of identified Major Internal Interfaces that need to be implemented. A comprehensive list of all interfaces is maintained separately.

Source System	Target System	Purpose	Mode / Frequency	Effort	Comments
Major Time Capture Systems	PeopleSoft HCM	Pass captured Time for final validation and approval	On Demand or Bi-Weekly	High	This integration exists for some Departmental Systems, already. New Systems that will or may integrate with PeopleSoft are: <ul style="list-style-type: none"> <li>• IRIS (Sheriff)</li> <li>• TRS (DDES, Parks, GIS)</li> <li>• Journyx (DNRP)</li> <li>• TeleStaff (DPH)</li> <li>• RMS (DJAD)</li> <li>• FASTER (DOT)</li> </ul>
PeopleSoft HCM	Many Employee based Side Systems	Provide List of Employee Information	Daily	Low	
Maximo	PeopleSoft HCM	Provide List of Valid Work Orders that can be entered during Time Capture	Real-time	Med	This interface replaced the Maximo / POL interface
PeopleSoft HCM	Maximo	Provide Daily Time charged to Work Orders	Daily	Med	This interface replaced the POL / Maximo interface
Work Order Systems	Oracle EBS Release 12	Provide financial-related transactions, such as usages with costs, so all financial transactions are accounted for in Oracle EBS (financial system of record).	Daily	High	The following Work order systems have been identified for integration with Oracle EBS R12 <ul style="list-style-type: none"> <li>• Maximo</li> <li>• M2</li> <li>• M5</li> <li>• Main Saver</li> <li>• Faster</li> </ul>
Oracle EBS Release 12	Work Order Systems	Pass updated transaction information needed for work orders.	Daily	Med	The Following Work order Systems have been identified for integration with Oracle EBS R12 <ul style="list-style-type: none"> <li>• Maximo</li> <li>• M2</li> <li>• M5</li> <li>• Main Saver</li> <li>• Faster</li> </ul>

Source System	Target System	Purpose	Mode / Frequency	Effort	Comments
Property Tax System	Oracle EBS	Provide property tax revenue and receivable data so all financial transactions are accounted for in Oracle EBS (financial system of record).	Daily	Med	
Telecom Billing	Oracle EBS	Provide billing information that can be allocated to the appropriate projects and cost centers in Oracle EBS.	Daily	Med	
Investment Systems	Oracle EBS	Provide investment transaction information so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	Following Side Systems are identified for integration with Oracle EBS R12 <ul style="list-style-type: none"> <li>• Resource IQ2 / TRI</li> <li>• LTD</li> <li>• LID / TRL</li> </ul>
Vendor Payment Systems	Oracle EBS	Provide transactions to be paid from Oracle EBS so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	Following Side Systems are identified for integration with Oracle EBS R12 <ul style="list-style-type: none"> <li>• Witness Payments</li> <li>• Veterans Payments</li> <li>• Workers Compensation</li> <li>• County Fair Payments</li> <li>• Elections Workers</li> <li>• Medical Payment Claims</li> <li>• Daily Medical Bills</li> <li>• Employers Unity Interface</li> </ul>
Point of Sale Systems	Oracle EBS	Provide cash receipt transactions so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	Following Side Systems are identified for integration with Oracle EBS R12 <ul style="list-style-type: none"> <li>• Paradigm Cashiering System</li> <li>• POS ( for DPH)</li> </ul>
eCommerce	Oracle EBS	Provide billing and cash receipt transactions so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	Following Side Systems are identified for integration with Oracle EBS R12 <ul style="list-style-type: none"> <li>• eTax</li> <li>• EPE ePay</li> <li>• EPE eFull</li> <li>• Pet Licensing</li> <li>• e-Pet</li> <li>• eREET</li> </ul>

Source System	Target System	Purpose	Mode / Frequency	Effort	Comments
County Receivables	Oracle EBS	Provide billing and cash receipt transactions so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	
Solid Waste Management System	Oracle EBS	Provide billing and cash receipt transactions so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	
Surface Water Management	Oracle EBS	Provide billing and cash receipt transactions so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	
Patient Billing	Oracle EBS	Provide billing and cash receipt transactions so all financial transactions are accounted for in Oracle EBS (financial system of record).	On Demand	Med	
Budgeting	Oracle EBS	Provide budget information	On Demand	Med	
Oracle EBS	Budgeting	Provide Chart of account values and details.	On Demand	Med	
Oracle EBS	Budgeting	Provide actual revenues and expenses.	On Demand	Med	
Oracle EBS	Budgeting	Provide Employee and Position information.	On Demand	Med	Oracle EBS will receive this data from PeopleSoft.

### 6.1.3 Major External Interfaces Business to Business (B2B)

This section covers the currently identified list of interfaces existing in ABT team documentation. More interfaces may be identified during the Fit-Gap and can be added later following future discussions.

Since King County currently run two HR, Benefits and Payroll Systems, many of the Major External Interfaces are duplicated between the two systems or have been consolidated within PeopleSoft which provides the integration for both employee populations. Examples of this consolidation are:

- 1) Benefits and COBRA Eligibility interfaces
- 2) State Retirement reporting.

When both systems provide the same integration such as ACH files to the bank for payroll payments, the employee will automatically shift from one interface to the other by moving into the PeopleSoft Bi-weekly payroll system. Eventually, all integration will be turned off after the last employee is paid from the Semi-Monthly MSA Payroll System. At present, there are 73 identified County interfaces that exist within PeopleSoft.

Source System	Target System	Purpose	Mode / Frequency	Effort	Comments
PeopleSoft	Benefit Vendors	Benefit Eligibility	Several Times per Month	Med	Already running from PeopleSoft after BHIP
PeopleSoft	Banks	Direct Deposits and Funds Transfers	Bi-Weekly	Med	Already running from PeopleSoft after BHIP
PeopleSoft	State of WA	Retirement Reporting and Employment Information	Bi-Weekly	Low	Already running from PeopleSoft after BHIP
MSA	PeopleSoft	HR, Benefits, Retirement Reporting and Pay Check Printing functions being processed within PeopleSoft	Bi-Weekly	Low	Already running from PeopleSoft after BHIP
PeopleSoft	MSA	Benefit Deductions on Semi-Monthly Payrolls	Semi-Monthly	Low	Already running from PeopleSoft after BHIP
Oracle EBS	RightFax	Purchase Order Fax system	On Demand	Low	Probably upgraded in 2009
Oracle EBS	Bank	Vendor ACH Payments from Oracle Payables	On Demand	Low	
Oracle EBS	Bank	Positive Pay Files to Bank	On Demand	Low	
Bank	Oracle EBS	Bank Reconciliation Downloads to Oracle Cash Management Module	On Demand	Low	
Bank	Oracle EBS	Auto Lock Box / Automatic Receipts	On Demand	Low	

## 6.2 Integration Tools:

Integration is a continuous process and requires the process to run at a predetermined time and frequency. Hence, understanding the Integration requirement is the first step in this process and involves indentifying the source and target applications. An understanding of the need to integrate data is essential to determine the approach that needs to be taken.

The Integration tools are central to the Integration process. Decision to use a certain tool is usually based on scalability, expendability and cost effectiveness of the tool or tools being used.

### 6.2.1 BPEL Process Manager (Recommended Integration tool)

Business Process Execution Language (BPEL) is an XML-based language for enabling task sharing across multiple enterprises using a combination of Web services. BPEL is based on the XML schema, simple objects access protocol (SOAP), and Web services description language (WSDL). BPEL provides an industry standard for business process orchestration and execution. Using BPEL, business processes can be designed that integrate a series of discrete services into an end-to-end process flow.

Oracle BPEL Process Manager provides a framework for designing, deploying, monitoring, and administering processes based on the BPEL language. Oracle BPEL Process Manager provides support for the following features:

- Web service standards such as XML, SOAP, and WSDL
- Dehydration (enables the states of long-running processes to be automatically maintained in a database) and correlation of asynchronous messages.

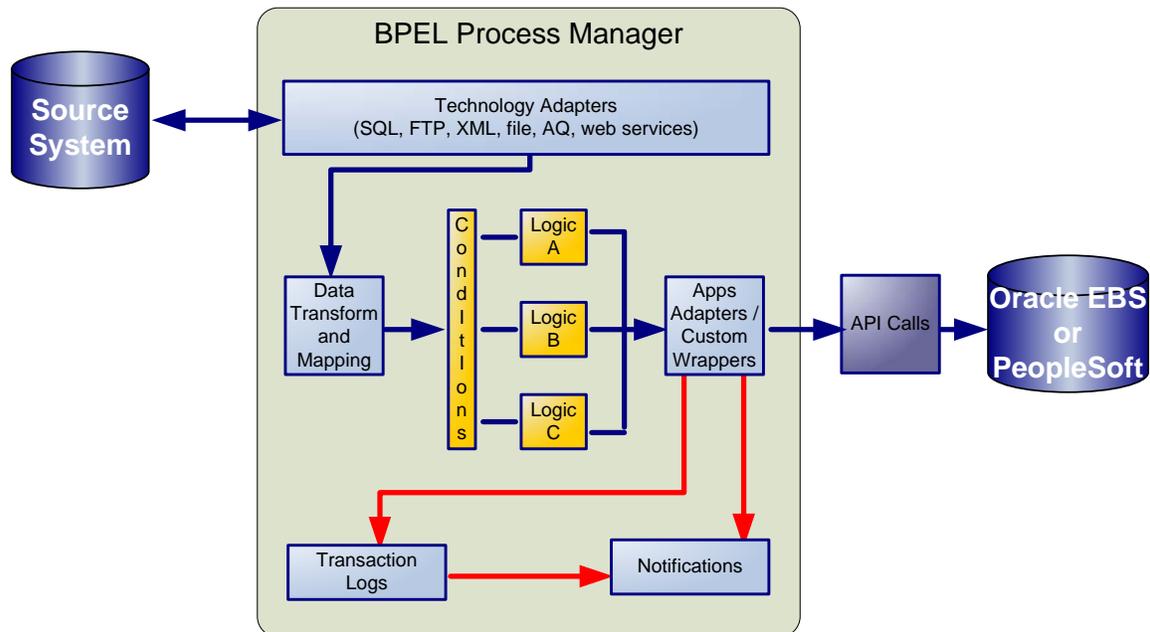
- Service-oriented architecture (SOA)
- Parallel processing of tasks
- Fault handling and exception management during both design time and run time
- Event timeouts and notifications
- Scalability and reliability of processes
- Management and administration of processes
- Version control
- Audit trails for tracing business flow history

BPEL Process Manager uses adapters to integration disparate software systems. Adapters are based on a set of standards such as J2EE Connector Architecture (J2CA), Extensible Markup Language (XML), Web service Invocation Framework (WSIF), Web service Inspection Language (WSIL), and Web service Definition Language (WSDL). There are three key types of adapters used by BPEL PM:

- **Technology Adapters:** Technology adapters integrate Oracle Application Server with transport protocols, data stores, and messaging middleware. Technology adapters are currently available with the BPEL Process Manager installation. These adapters include:
  - FTP
  - JMS
  - Database
  - Advanced Queuing
  - Files
- **Legacy Adapters:** Legacy adapters integrate Oracle Application Server with legacy and mainframe applications. These adapters include Tuxedo, CICS, VSAM, IMS/TM, and IMS/DB. Legacy adapters are available as part of the OracleAS Adapters.
- **Packaged-Application Adapters:** Packaged-application adapters integrate Oracle Application Server with various packaged applications. These adapters provide integration with many (although not all) application entities without custom code and API calls. Packaged-application adapters need to be licensed at an extra cost. Below are the packaged application adapters that can be considered.
  - Oracle E-Business
  - PeopleSoft

The illustration below depicts an Inbound Interface into Oracle Applications using the BPEL approach:

## Integration Process: Inbound Interface Steps using BPEL Approach



Typical key interface steps in this approach include the following:

- Source data is accessed through technology (or other) adapters, such as the FTP Adapter to interact with local and remote file system directories. The FTP adapter can check for files at a pre-determined polling frequency. The FTP Adapter allows file to be deleted, moved to an archive directory, or left as-is after processing. The FTP Adapter can be configured to read data from a delimited data, fixed length files, Binary Data files or other files types that the source system/vendor may use.
- BPEL PM Designer graphical user interface is used to perform numerous functions that control the interface process, in addition to working with adapters. Some of these functions include:
  - Data transformation
  - Conditional logic
  - Data mapping
  - Applying business rules
  - Fault handlers to define how a BPEL process responds when services return data other than what is normally expected; these can be either business faults (problem with the data) or run time faults (problems with the BPEL Process or a service)
  - Notifications can be sent to a user or a group using email, pager or SMS.
- The data is updated in the destination system using the E-Business Suite adapter (or other adapters). The E-Business Suite adapter provides connectivity to interface tables, Application programming interfaces (APIs), XML Gateway transactions and concurrent programs.
- Process can be monitored and audited using the BPEL PM Console For additional reporting, reports can be developed using Reports 6i and Discoverer 10g to report on the BPEL PM and interface data.
- **Advantages:**

- BPEL Process Manager is a common tool that Oracle EBS and PeopleSoft can use for Integration between and with other software systems.
  - The BPEL PM Console provides a mature web-based interface for management, administration and debugging of processes. Visibility into the state of the integration process is provided at the task step level.
  - BPEL Process Manager provides a drag and drop process modeler for building interface logic, thereby providing graphical translation and mapping of business requirements into program logic.
  - BPEL PM Console reduces the cost and complexity of deploying and managing business processes: BPEL PM Console enables visual monitoring of the execution of each process and provides drill downs into audit and enables viewing the details of each conversation or debug a running flow against its BPEL implementation.
  - BPEL is a process orchestration language, allowing integration logic as complex as required by an integration process. This includes error/exception handling, parallel processing, conditional branching, notifications and human intervention (e.g. approval).
  - BPEL Process Manager uses integration points defined in the Adapter for Oracle Applications. Unlike natively defined APIs and Open Interfaces, Oracle has stated that the interface for integration points currently exposed by the Adapter for Applications will be maintained in the future.
- **Disadvantages:**
    - BPEL Process Manager is a separately licensed option to Oracle Application Server (AS10g) Enterprise Edition. Additional infrastructure components (e.g. a separate server) may be needed for AS10g and BPEL PM. Technology adapters come at no extra cost, once BPEL Process Manager is licensed, although applications adapters need to be licensed separately.
    - BPEL Process manager will benefit the project if it can reduce the overall time required for the implementation and maintenance. Early in the project, the time required to become proficient with this tool may negate some of the benefits, however, long-term efficiencies and savings can be achieved.

## 6.2.2 PeopleSoft Integration Broker (Not Recommended)

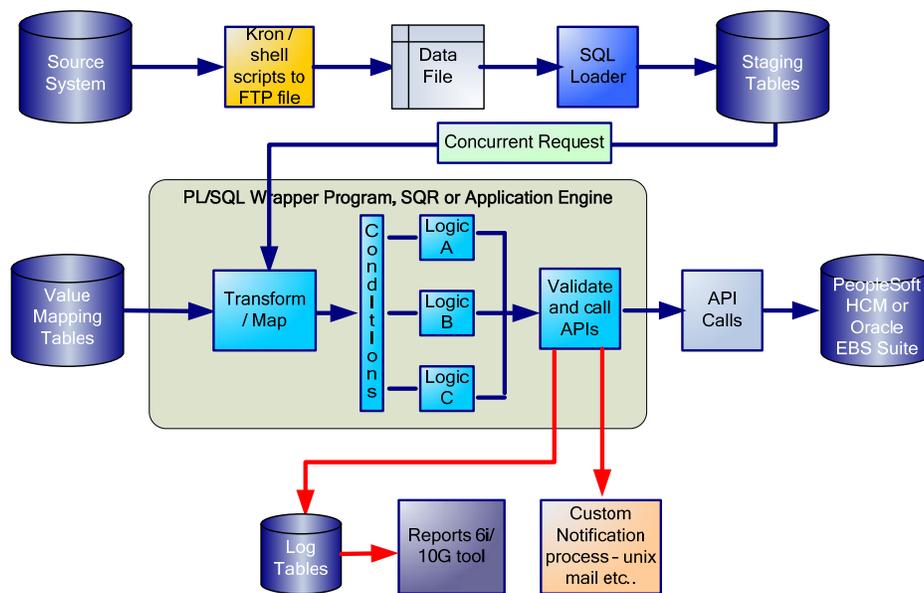
This delivered integration toolset was evaluated and not recommended when compared to advantages of BPEL Process Manager. See Appendix for more details of why it was not recommended.

### 6.2.3 Traditional tools - PL/SQL, SQL\*Loader, SQR, and Application Engine (Recommended for limited integrations when an existing interface is sufficient or the sender/receiver is not able to integrate with BPEL Process Manager)

Oracle E-Business Suite integration has typically been accomplished using “traditional” Oracle tools. This approach includes building custom database staging tables, writing SQL\*Loader scripts to populate these tables, and writing custom SQL and PL/SQL for data integration, data transforming, data loading through open interfaces and APIs, and data extracts.

The illustration below depicts an Inbound Interface into Oracle E-Business Suite using these traditional tools.

**Integration Process: Inbound Interface Steps using Traditional Approach**



Typical key interface steps using this approach include:

- Concurrent manager requests to allow shell scripts, SQL\*Loader scripts, and PL/SQL Programs to be scheduled or run on demand through Oracle E-Business Suite.
- Operating system shell scripts to perform:
  - Calls to ftp commands to transfer files from the source to destination systems
  - Calls to SQL\*Loader scripts to populate staging tables (for inbound interfaces)
  - Other file formatting and error handling tasks
- SQL\*Loader is an Oracle database utility that is user to load data from flat files (delimited or fixed width columns) into Oracle tables. It also allows limited data transformations, such as populating default or constant values during the process of loading data.

- PL/SQL Programs: Custom PL/SQL programs are used to load data into Oracle E-Business Suite either using API's or Open Interface tables. All conditional logic is handled within the P/LSQL package. The PL/SQL package also performs most error handling as well, generally populating additional custom tables for error reporting.
- Notifications: Unix mail, Oracle Workflow or other such option can be utilized to proactively notify users of interface results.
- Oracle Reports 6i/10G and Discoverer: These tools can be used to report on the interface results stored in staging and error tables. For outbound interfaces, Reports 6i/10G and Discoverer can also be used to create extract files, rather than PL/SQL packages.

**Advantages:**

- This approach is time-tested, and can frequently reuse existing interface solutions.
- The integration tools come at no extra cost to King County.

**Disadvantages:**

- The biggest drawback of the traditional approach is the lack of visibility into the integration process during execution. State information about the process is limited and is often only available after all processing is complete.
- Development of these interfaces is done using proprietary tools and not web standards-based. Standards-based integration provides opportunities for reuse and easier integration with other standards-based software systems.
- Almost all integration requires significant custom code. Maintenance costs of custom code are high in comparison to model-driven integration logic design, often requiring a great deal of technical expertise to change or modify interface logic.
- Error handling capabilities are not provided, and all require custom coding.

### **6.3 Interface Design:**

The Implementation team will provide a detailed design document for each identified interface. The document will contain detailed mapping and will consist of mapping of required data element in the source application back to a data element in the target application and vice versa.

The interface design document also captures the business rules that govern the design of this interface, provide details on how to execute the interface and also address the frequency at which this interface would run. The following will be addressed by each interface design document.

- *Source and Target Systems:* The interface design document will provide the details of the source system and target system and provide a detailed mapping of each data element that is required by the target system
- *Data file types:* The design will detail how type of data files (such as flat files versus XML based files) will be provided by the source system and what the layout would be.
- *Frequency:* Some interfaces may require a real-time data exchange, while other interfaces may require a daily or monthly or annual integration requirement. The Implementation team will make a determination on which specific technology would best meet the needs in order to develop the interface.
- *Conditional Logic:* Business rules can be incorporated as conditional logic and data transformation and data mapping is done to provide a graphical transformation of data.
- *Exception Handling:*
  - *Error Handlers:* Error log tables are created to capture the details of the records that are in error. Any errors are reported to the users using email or running a report on the error log table.
  - *Notifications:* Notifications can be sent to a user or a group using email, pager or SMS. Appropriate people are notified when errors occur.

Note: Departments will leverage skill sets which currently exist within their departments as the primary source for technology tooling support. For example: Hastus and M5 will likely extract and sent to ABT using their current tools. If there is a need for them to use BPEL, we will work that out based on the requirement. Reducing dependency on various middleware utilities for the large interfaces is a consideration. However, there is a cost to train users on BPEL and the payback is beyond the core project to implement ABT. BPEL training will be needed for certain resources who join ABT team from the county.

### **6.4 Unit / Integration Testing**

Testing and validating each interface against the business requirements serves as a validation point and ensures the business requirements are properly interpreted and translated into programmable logic.

Technical developers perform unit testing for each interface while programming the interface. Development Instance will be used of all technical development. Unit testing will be performed on sample records. Interfaces that have a requirement for handling large amounts of data, load testing will be done using the entire record population.

While performing load testing, the interfaces are timed for performance. Any performance issues encountered are analyzed and tuning in the Development instance.

System Integration testing and User Acceptance Testing will be performed by the business users to ensure that the business requirements are met.

## ***6.5. Code Promotion and Version Control***

As there will be several iterations that need to be performed within an instance and across instances, the technical developers need to ensure that the correct interface program code is being migrated between instances.

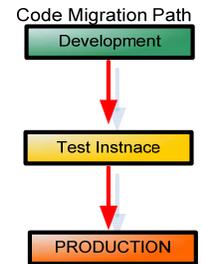
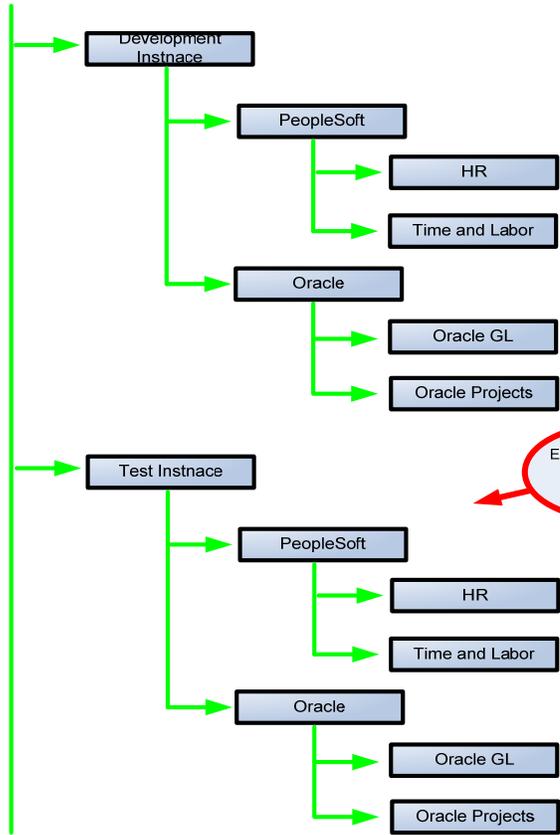
It is recommended that ABT purchase or extend licenses of a version control application such as Serena PVCS or Microsoft Visual SourceSafe. The County currently uses Visual SourceSafe.

In the absence of a Version Control Software, the Implementation team will use Network drives that are backed up often to back up the custom interface programs.

# Code Promotion & Version Control

<Network Drive>

Directory Path:  
Workspaces  
=> ABT Program  
=> Library  
=> Technology  
=> Interfaces



Each Instance will have directory structure

## 6.6 Interface Approvals

Each Interface needs to be approved at major milestones.

- Integration List Approval
- Design documents are approved in Integration planning phase
- Production Approvals - given once integration testing is done and data validated

Approval planned at major milestones:

Milestone	Purpose
Discover	List of Identified Interfaces
Design	Interface Design Specifications
Develop	Unit testing and Integration testing
Deployment	Production Approvals

The following individuals need to approve the interface process for each phase:

Approver	Documents for Approval
<Program Manager>	<ul style="list-style-type: none"> <li>• List of Identified Integrations</li> <li>• Production Approvals</li> </ul>
<Department Approver>	<ul style="list-style-type: none"> <li>• Interface Design Specification</li> <li>• Unit testing and Integration testing</li> <li>• Test and Production Data Validation</li> </ul>
System Implementer Technical	<ul style="list-style-type: none"> <li>• Interface Design Specification</li> <li>• Unit testing and Integration testing</li> </ul>
ABT Functional Lead	<ul style="list-style-type: none"> <li>• Interface Design Specification</li> <li>• Unit testing and Integration testing</li> <li>• Test and Production Data Validation</li> </ul>

## 7.0 Roles and Responsibilities

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Interface program development requires active participation of the project team members working in a collaborative environment with departments. The ABT implementation team will assume a leadership role in the development of interface programs.

Technical development tasks will require the assistance of the functional team to assist with data mapping and to ensure that business process requirements are being met. BPEL code will be written for the interface by the ABT team and the department IT people will write the outbound or inbound half of the transaction on the side-system side using existing tools.

The table below depicts the responsibility between King County team and the Implementation team on the **Core** side of each integration:

Process	Business Users - King County Departments	Implementation Team (ABT Direct and Consultants)
List of Interfaces & Requirements	Shared	Shared
Data Mapping and Design Specs	Shared	Shared
Interface Program development	Assist	Responsible
Unit Testing	Assist	Responsible
Integration testing	Assist	Responsible
User Testing	Responsible	Assist
Validate Data	Responsible	Assist

The table below depicts the responsibility between King County team and the Implementation team on the **Departmental** side of each integration:

Process	Business Users - King County Departments	Implementation Team (ABT Direct and Consultants)
List of Interfaces & Requirements	Shared	Shared
Data Mapping and Design Specs	Shared	Shared
Interface Program development	Responsible	Assist
Unit Testing	Responsible	Assist
Integration testing	Shared	Shared
User Acceptance Testing	Responsible	Assist
Validate Data	Responsible	Assist

## 8.0 Knowledge Transfer for Maintenance and Support

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King County needs to identify personnel to support the integration components for on going maintenance and support that may be necessitated by a change in business process or for building new integration requirements.

**Retooling of Support Staff:** It is recommended that the support personnel identified by King County undergo training on the software programming languages and tool that are employed at King County implementation. It is also recommended that they register themselves into Oracle technology user forum discussion boards and Oracle Knowledge base (such as Oracle Metalink etc.).

**Knowledge Transfer:** The Implementation team provides knowledge transfer to personnel identified by King County, for each of the interfaces that would be delivered as part of the implementation. After Interfaces are in Production, Knowledge Transfer sessions will be lead by the System Integrator for the benefit of the Support Team. The unique challenges that may be faced supporting each integration point will be explained. In order to enhance the knowledge transfer and to speed up the learning curve, it is recommended that support personnel undergo training at Oracle University or any other comparable training program, if they lack the specific technical skills needed.

The following Toolsets will be offered to appropriate technical resources:

Common Tool for PeopleSoft and Oracle EBS	Tool / Language
Both	BPEL Process Manager
EBS	PL SQL
EBS	Oracle JDeveloper
Both	XML
Both	SQL
PeopleSoft	Component Interface
PeopleSoft	SQR
PeopleSoft	Application Engine
PeopleSoft	PeopleCode

# Appendix A – Side System Matrix

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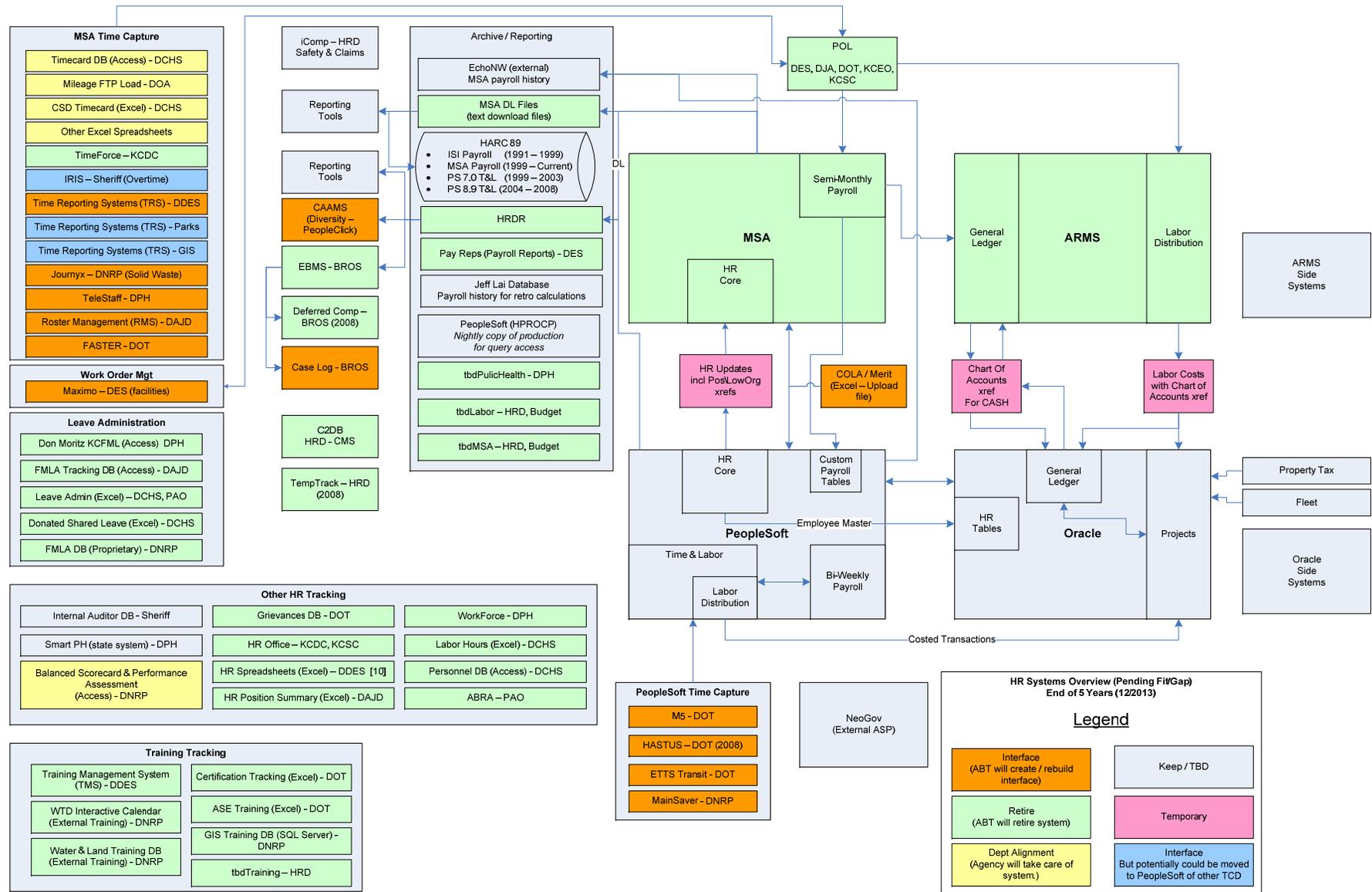
## Financials and Human Capital Technical Inventory

<a href="#">DIP Deliverables (ABT Operations &amp; Change Management Committee SharePoint Team Services Link)</a>	Inventories are also posted on internal ABT shared drive:
King County EBS Technical Inventory DIP Final 5-27-08	T:\Projects\Side Systems Integration\CIBER - Technical\King County EBS Technical Inventory.xls
King County HCM Side Systems Matrix DIP Final 5-27-08	T:\Projects\Side Systems Integration\CIBER - Technical\King County HCM Side Systems Matrix Combined.xls

See next page for diagram summarizing the King County HCM Side Systems Matrix DIP Final 5-27-08 above

# Appendix A – Side System Matrix continued

This diagram summarizes the King County HCM Side Systems Matrix DIP Final 5-27-08 listed above.



## Appendix B - About Integration Tools

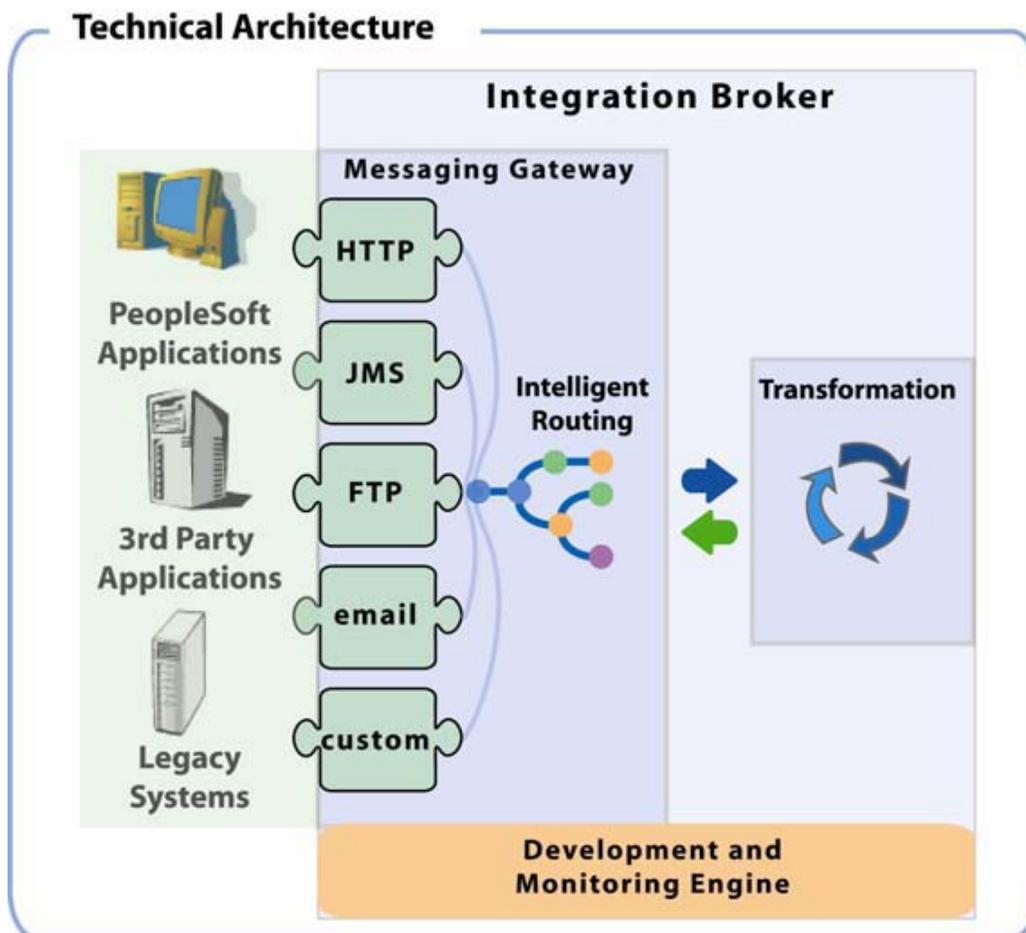
### PeopleSoft Integration Tools:

#### Integration Broker

This delivered integration toolset was evaluated and not recommended after comparing the advantages and disadvantages to the BPEL Process Manager

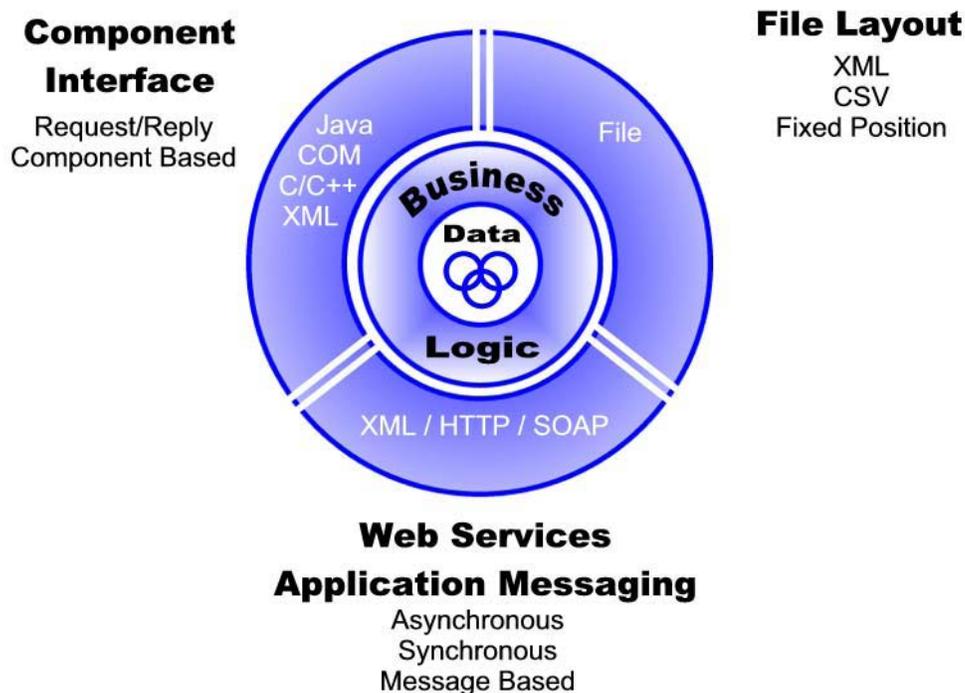
The Integration Broker provides the Web service gateway functions for PeopleSoft Enterprise applications. This includes the ability to produce and consume industry standard Web services and is comprised of four key elements: Packaged Connectors, Intelligent Routing, Transformation, and a Development and Monitoring Environment.

The Integration Broker itself consists of several PeopleTools technologies:



- Application Messaging— messaging architecture for both synchronous and guaranteed delivery asynchronous integration into and out of the Integration Broker. Application Messaging is really the heart of the PeopleSoft Integration Broker.

- **Component Interfaces**— Object-oriented, request/reply, component architecture that encapsulates PeopleSoft data, business logic and security.
- **File Interfaces**— Robust file processing capabilities for file-based integration—still a common method for addressing integration requirements. These core technologies of the Integration Broker stack are discussed in more detail later in this document.



## Integration Broker and Web Services

Pure internet integration capabilities have been core to the PeopleSoft Pure Internet Architecture (PIA) since the first release of PeopleSoft 8. A design goal is that any system should be able to access PeopleSoft components and integrate seamlessly with PeopleSoft systems using standard internet protocols. XML over HTTP has been central to the technology advancement. Both pure internet access and integration have taken off since the design and development of PIA. Pure internet access received much of the initial attention in the market place. Now with the growth of Web services, pure internet integration is becoming more prevalent.

The PeopleSoft Integration Broker facilitates the use of Web services for interacting with other systems, as well as exposing the business logic in any PeopleSoft application. Any discrete component of application functionality can be exposed as a Web service. Examples include product inventory, employee address, and customer profile. Any of these application components can be published and accessed behind the firewall or over the internet as Web services.

One of the reasons Web services have become so popular is because they are loosely coupled. They have well defined interfaces and can be easily accessed from remote systems using internet technologies. They require a much simpler level of coordination between systems. For instance, the underlying technology behind the Web service can be changed and replaced without impacting the systems that invoke it. This loosely coupled nature of Web services simplifies the integration process, lowering the cost of integration and maintenance while making it easier to integrate applications than

techniques used in the past.

Web services offer extensibility over previous technologies. Once you implement a Web service interaction between two systems, you can extend that interface to plug in additional systems. Each new system that will invoke that service just has to know what data to put in the request XML and where to send it. Web services align with the no code on the client aspect of the PeopleSoft Pure Internet Architecture, so there is no API-specific code to maintain at each system that participates in the business process.

Implementing integrations with Web services is one way to solve cross-platform integration issues. A PeopleSoft Web service can be invoked from applications developed in Visual Basic, Java, C/C++, Perl, etc. Most development languages and enterprise level packaged software products have support for Web services, therefore reducing the amount of time required to interface with PeopleSoft.

The following list of advantages and disadvantages are based on the experience of CIBER/Solbourne consultants and compared to the advantages and disadvantages of the recommended Integration tool, BPEL. Integration Broker did not appear to be robust enough to handle the heavy lifting that will be required or offer the County the same labor savings that BPEL has the potential to deliver.

- **Advantages:**

- Integration Broker is included in the PeopleSoft Suite
- Integration Broker works very well with PeopleSoft to PeopleSoft integration because of the delivered integrations points require the same data schemas.

- **Disadvantages:**

- Integration Broker required a separate database install to run properly.
- Integration Broker requires a specialized set of skills to operate.
- Integration Broker required constant monitoring to ensure message queues are not backed up.
- Oracle EBS and PeopleSoft do not have the same data schemas making the integration more difficult.

## **SQR**

Structured Query Report Writer (SQR) is a programming language that combines the power of Structured Query Language (SQL) queries, the sophistication of procedural logic, and the freedom of multiple-platform development. Increasingly popular since Oracle selected this language as its main SQL processing and reporting tool, SQR's unique combination liberates developers from the constraints of SQL and allows them to concentrate on the application aspects of their programs.

SQR is not just a language. It also includes an industrial-strength engine for extracting, transforming, and distributing data throughout the enterprise. It works equally well on both client and server, crosses almost seamlessly between different platforms, and covers nearly all relational databases.

Unlike most report writing tools, SQR is extremely flexible. With SQR you can extract data from and load data onto the database, process complex file structures, print sophisticated reports with dynamic breaks at multiple levels, create interfaces between different systems, generate form letters with business charts, graphs and images, and perform many other tasks. At

the same time, for those who used to work with "drag-and-drop" Graphical User Interface (GUI) development tools, SQR may look a little old-fashioned and "Cobol-like" (although an optionally purchased SQR Workbench eliminates this problem). The absence of a slick development environment is fully compensated by the robustness, scalability, and solid performance of this product: this is a serious tool for serious people.

*Additional notes:* In addition to its report capabilities, SQR is a flexible and comprehensive tool for extracting and manipulating database tables and flat files. Programs written in SQR can be run on a Windows workstation, the application server, or supported DBMS servers.

SQR for file-based processing is considered a deprecated feature, and any new development in this regard is strongly discouraged. Explore the possibilities of set-based processing in Application Engine programs, or a combination of Application Engine programs with PeopleCode.

## **SQL**

SQL is an ANSI (American National Standards Institute) standard for accessing database systems. SQL statements are used to retrieve and update data in a database.

SQL works with database programs like Access, DB2, Informix, Microsoft SQL Server, Oracle, Sybase, and many others.

## **Application Engine**

Commonly referred to as AE, allows you to create applications that perform background SQL and PeopleCode processing against your data. It executes the SQL you provide it. Application Engine programs provide for effective date processing logic, the ability to specify platform specific SQL, the ability to process group (i.e. sets) of rows at one time, the ability to process one row at a time, and can execute PeopleCode. Application Engine programs can also invoke a COBOL program using RemoteCall. An Application Engine program can be executed in batch using the Process Scheduler, invoked synchronously using the CallAppEngine PeopleCode function, or invoked asynchronously via the ProcessRequest PeopleCode object. Application Engine programs run on the application server (i.e. Windows NT or Unix server).

Implementing Application Engine using set based processing is the desired approach when possible for new batch processing at PeopleSoft. "Row-at-a-time" PeopleCode processing should only be used when you are confident that it will not lead to performance problems.

*Use Application Engine:*

- When you need to process a number of rows in a table in batch using set based or row based processing.
- When you want to load a flat file to a table, or unload a table to a flat file in batch using the Process Scheduler.
- When you need to write a subscription process in Application Messaging.
- when you want to execute a common set of logic from PeopleCode, and not wait for the called program to complete before executing the next statement in the calling program (i.e. when you want to execute an asynchronous subroutine using the ProcessRequest PeopleCode object).
- When you want to execute a common set of logic from PeopleCode and wait for the called program to complete before executing the next statement in the calling program (i.e. when you want to execute a synchronous subroutine using the CallAppEngine PeopleCode function). Use Application Engine if the common logic will also be used to process high volumes in a batch mode, otherwise use a PeopleCode function if the common logic will

primarily be used for low volumes in an on-line environment.

#### *Do not use Application Engine*

- When you need to perform lengthy and extensive computations and the performance of those calculations is critical (consider using AE calling a COBOL subroutine to perform the calculations).

## **Component Interface**

Component Interfaces (CI) expose the rich functionality delivered in the hundreds of components that make up PeopleSoft products. A component is an atomic transaction which implements a business process or function. A component interface provides real time synchronous access to the PeopleSoft business rules and data associated with a business component. The interface is exposed via standard access methods. Component Interfaces can be viewed as "black boxes" that encapsulate PeopleSoft data and business processes, and hide the details of the structure and implementation of the underlying page and data. The actual interface consists of a set of clearly defined properties and methods that follow an object-oriented programming model. External applications can only access a component's data using the interface's specified properties or methods.

#### *Use Component Interface*

- When third parties must retrieve and/or update PeopleSoft data real time using request/reply synchronously.
- When you want to recycle online business logic associated with a PeopleSoft component (for example in an Application Engine program or through Application Messaging).

#### *Do not use Component Interface*

- When a process in one PeopleSoft database wants to get or update data in another PeopleSoft database in a near real time asynchronous environment (use Application Messaging).
- When the processing logic you want to componentize can not be represented by a PeopleSoft component (use a PeopleCode function or an Application Engine program passing parameters).
- When you don't want the calling program to wait while the called component completes its processing (use Application Messaging to publish a message to an Application Engine program or invoke an Application Engine program from PeopleCode using the ProcessRequest PeopleCode object).

## **People Code**

(File layout object) The File class provides methods and properties for reading from and writing to external files. Most application interfaces to files require complex parsing of file data. Files that allow for this kind of complexity in a PeopleSoft application are based on a file layout. A file layout is a definition (or mapping) of a file to be processed. It identifies where in the file data fields are located. This powerful interface allows application developers to access data from a file as they would a message or a panel buffer (scroll). There is no need to parse each file record into fields.

The following formats are supported by file layout definitions:

- Fixed Format Positional File (FIXED)

- Variable Format Delimited File (CSV)
- Tagged Hierarchical Data File (XML)

File layouts will be unique to a specific format, and may only process that particular type of formatted file. The definition created in the Application Designer retains a consistent look and feel irrespective of format. File layouts rely solely on PeopleCode as the engine behind the actual data access and movement.

#### *Use File Layout Object*

- When you need to load a flat file to a table, or when you need to unload a table to a flat file.

## **XML**

XML is subset of the Standard Generalized Markup Language (SGML) defined in ISO standard 8879:1986 that is designed to make it easy to interchange structured documents over the Internet. XML files always clearly mark where the start and end of each of the logical parts (called elements) of an interchanged document occurs. XML restricts the use of SGML constructs to ensure that fall back options are available when access to certain components of the document is not currently possible over the Internet. It also defines how Internet Uniform Resource Locators can be used to identify component parts of XML data streams.

By defining the role of each element of text in a formal model, known as a Document Type Definition (DTD), users of XML can check that each component of document occurs in a valid place within the interchanged data stream. An XML DTD allows computers to check, for example, that users do not accidentally enter a third-level heading without first having entered a second-level heading, something that cannot be checked using the HyperText Markup Language (HTML) previously used to code documents that form part of the World Wide Web (WWW) of documents accessible through the Internet.

However, unlike SGML, XML does not require the presence of a DTD. If no DTD is available, either because all or part of it is not accessible over the Internet or because the user failed to create it, an XML system can assign a default definition for undeclared components of the markup.

XML allows users to:

- bring multiple files together to form compound documents
- identify where illustrations are to be incorporated into text files, and the format used to encode each illustration
- provide processing control information to supporting programs, such as document validators and browsers
- Add editorial comments to a file.

It is important to note, however, that XML is not:

- a predefined set of tags, of the type defined for HTML, that can be used to markup documents
- A standardized template for producing particular types of documents.

XML was not designed to be a standardized way of coding text: in fact it is impossible to devise a single coding scheme that would be suit all languages and all applications. Instead XML

is formal language that can be used to pass information about the component parts of a document to another computer system. XML is flexible enough to be able to describe any logical text structure, whether it be a form, memo, letter, report, book, encyclopedia, dictionary or database.

## **Oracle EBS Integration Tools:**

### **PLSQL**

PL/SQL (Procedural Language/Structured Query Language) is Oracle Corporation's proprietary procedural extension to the SQL database language. Some other SQL database management systems offer similar extensions to the SQL language. The key strength of PL/SQL is its tight integration with the Oracle database; some of the features are outlined below

- Can be used to create Oracle packages, procedures and triggers
- Data centric and tightly integrated into the database
- Proprietary to Oracle and difficult to port to other database systems
- Data manipulation is slightly faster in PL/SQL than in Java

### **BPEL Process Manager**

Business Process Execution Language (BPEL) is an XML-based language for enabling task sharing across multiple enterprises using a combination of Web services. BPEL is based on the XML schema, simple objects access protocol (SOAP), and Web services description language (WSDL). BPEL provides an industry standard for business process orchestration and execution. Using BPEL, business processes can be designed that integrate a series of discrete services into an end-to-end process flow.

Oracle BPEL Process Manager provides a framework for designing, deploying, monitoring, and administering processes based on the BPEL language. Oracle BPEL Process Manager provides support for the following features:

- Web service standards such as XML, SOAP, and WSDL
- Dehydration (enables the states of long-running processes to be automatically maintained in a database) and correlation of asynchronous messages.
- Service-oriented architecture (SOA)
- Parallel processing of tasks
- Fault handling and exception management during both design time and run time
- Event timeouts and notifications
- Scalability and reliability of processes
- Management and administration of processes
- Version control
- Audit trails for tracing business flow history

BPEL Process Manager uses adapters to integration disparate software systems. Adapters are based on a set of standards such as J2EE Connector Architecture (J2CA), Extensible Markup Language (XML), Web service Invocation Framework (WSIF), Web service Inspection Language (WSIL), and Web service Definition Language (WSDL). There are three key types of adapters used by BPEL PM:

- **Technology Adapters:** Technology adapters integrate Oracle Application Server with transport protocols, data stores, and messaging middleware. Technology adapters are currently available with the BPEL Process Manager installation at no extra cost. These adapters include:
  - FTP
  - JMS
  - Database
  - Advanced Queuing
  - Files
- **Legacy Adapters:** Legacy adapters integrate Oracle Application Server with legacy and mainframe applications. These adapters include Tuxedo, CICS, VSAM, IMS/TM, and IMS/DB. Legacy adapters are available as part of the OracleAS Adapters.
- **Packaged-Application Adapters:** Packaged-application adapters integrate Oracle Application Server with various packaged applications. These adapters provide integration with many (although not all) application entities without custom code and API calls. Packaged-application adapters need to be licensed at an extra cost. Below are the packaged application adapters that can be considered.
  - Oracle E-Business
  - PeopleSoft.

### **XML Gateway**

XML Gateway is used to insert as well as receive Open Application Group Integration Specification (OAGIS) compliant documents from Oracle E-Business Suite. The similar e-Commerce Gateway can also be used to provide a common, standards-based approach for Electronic Data Interchange (EDI) integration between Oracle Applications and third party applications.

XML Gateway and e-Commerce Gateway are primarily used for Business-to-Business (B2B) integration. While XML transactions are mostly based on a single transaction and are event based, EDI transactions are more batch oriented.

XML Gateway and/or e-Commerce Gateway can be used alone, or can be integrated into BPEL PM processes using the E-Business Suite adapter.

### **Web ADI (Application Desktop Integrator)**

Web ADI (Application Desktop Integrator) is included with Oracle E-Business Suite 11i. Web ADI is a spreadsheet-based extension to Oracle Applications that offers full cycle accounting and asset management within the comfort and familiarity of a spreadsheet without any technical development work. Web ADI does not provide automated integration, but for data that is infrequently interfaced, it can provide a very simple and intuitive mechanism for users to perform the data updates.