

Effort Reporting System

Rough Estimate for Development of Stand-alone System

DRAFT

January 30, 2004

Deleted: 22

An initiative led by the Berkeley, Davis, Los Angeles, San Diego, and San Francisco campuses to develop a new Effort Reporting System (ERS) has resulted in the development of requirements definition (http://www.ucop.edu/sysdev1/ers/ERS_Requirements_Document_Final_1-14-04.pdf) for a system to replace the old A21/PAR system currently in use. As the final step in the requirements phase of this initiative, the ERS Project Management Group requested an estimate of the timeframe and costs associated with development of a system meeting the stated requirements. Three documents comprise the resultant estimate:

- This document, which describes the major tasks associated with development and delivery to campuses of the ERS system.
- An hours estimate worksheet (http://www.ucop.edu/sysdev1/ers/Effort_Reporting_System_Rough_Cost_Estimates_20040122.pdf)
- A preliminary schedule (http://www.ucop.edu/sysdev1/ers/Effort_Reporting_System_Rough_Cost_Estimates_20040122.pdf)

This rough estimate excludes campus implementation tasks and costs, which will be documented separately. Similarly, ongoing support and maintenance tasks and associated costs are excluded from this estimate and will be documented separately.

Key Assumptions

The most significant assumption driving this estimate is that the ERS will be operated separately for each campus, in a campus technical context. Combined with the fact that the requirements definition also calls for the ERS to be web-based system, the resulting system must be portable to the local campus operating environment. As a result, this estimate makes some key assumptions about the target technical environment in which the ERS will operate:

Deleted: two

- the code base will be java/J2EE, though campuses may choose to use different application server software in which to run the code.
- a non-specific relational database management system (dbms) [e.g., Sybase, Oracle, DB2] will house the data.
- interfaces are through web services wherever possible.
- html will be W3C-compliant to accommodate the widest range of client browser software as possible.
- web transactions will be encrypted for security.

Formatted: Bullets and Numbering

Deleted: Effort Reporting System
Rough Estimate.doc

[Effort Reporting System Rough Estimate 20040130-TRG.doc](#)

With the emphasis on portability, a java/J2EE code base provides the greatest degree of code portability. However, designs and the developed system will need to shy away from dbms-dependent features (e.g., dbms-dependent features such as triggers and stored procedures) to best address portability among dbms's.

A critical source of data for the ERS will be PPS. There have been some discussions about the synergies with PPS such that the technical environment in which web-based PPS components operate could be one of the target environments in which the ERS will operate. This will require further exploration at the beginning of the development phase. *However, there is no intention of building/integrating the ERS in the old PPS COBOL/CICS code base.*

Another key assumption governing this estimate is the need for the ERS to use data from a variety of local campus system types (e.g., authentication, authorization, financial, etc.). Implementations of a single system type vary from campus to campus. For example, each campus uses different authentication systems. Such variation requires that the ERS be able to interface directly with local campus systems or be able to make use of the data from such systems. Interfaces with local campus systems will need to be developed in a modular manner such that customization of the interfaces to the local system context can be accomplished without detriment to the common code ERS code base. As a result, many of the tasks described in the estimate pertain to interface design and development related to achieving flexibility in the interfaces with campus systems.

The individual tasks described in this estimate are derived from the requirements definition document and are high level in nature.

Coarse estimates of development time are provided in the worksheet, based on the level of detail specified in the requirements definition and based on experience with similar java/J2EE development projects. Estimates are subject to revision as further clarifications to the requirements emerge during the development phase (in some cases estimates may drop while in other cases estimates may rise).

A large time estimate has been provided for the two web presentation design tasks, where several iterations of time-intensive design and revision based on campus feedback will be needed to achieve the best result for the participating campuses.

The preliminary development schedule is based on the development time estimates for the associated tasks. This preliminary schedule attempts to achieve as much concurrency of work as possible while keeping the project manageable. The schedule includes initials of generic resources assigned to each task (to the right of each task timeline). Examples: "P1" refers to "programmer 1", "D1" refers to "web site designer 1", "PM" refers to "Project Manager", "LN" refers to "Liason".

A rate of \$100/hour is assumed, across the board, for cost estimation purposes. \$100/hour is a reasonable ceiling on the average rate for contractor resources to accomplish the tasks

Deleted: Effort Reporting System
Rough Estimate.doc

described in this estimate. Contractor rates may come in lower than this average rate. Costs for University staff (if any) working as dedicated developers on these tasks will certainly come in lower than this rate.

The following sections present descriptions of the development tasks. The order of tasks in the following sections correspond to the order of presentation in the hours worksheet and the preliminary development schedule.

Deleted: Effort Reporting System
Rough Estimate.doc

Description of Development Tasks

Architecture/Design

This set of tasks takes place early in the project and sets the stage for the subsequent detailed technical development work.

- Database Design – design of the database(s) that will support the transaction processing and standard reporting associated with the ERS.
- Presentation Design –Initial - this task encompasses the design of the overall presentation of web pages (screens), navigation, etc. optimizing for the appropriate uses of the web portion of the system and providing flexibility for implementation in the campus portal context. The product of this initial presentation design is a reasonable first “draft” of the detailed web presentation for review by users from participating campuses.
- Presentation Design – Revised – revision of the overall web presentation based on feedback from the review of the initial presentation design.
- Data Interfaces – Overall design of interfaces for different data sources needed by the ERS and which allow for implementation of the system in different campus environments. Examination and general design of generic and/or application-specific interfaces to Payroll, authentication, authorization, contract and grant, financial, and cost sharing information.
- Application Code Design – determination of a code architecture which supports both the presentation design and which provides a structure to make development and ongoing maintenance of the ERS as straightforward as possible. (e.g., Model-View-Controller, Struts, etc.)

Development

This set of tasks represents the bulk of the detailed technical development work.

- Data Interfaces – development of the individual interfaces, and associated data quality edits, for retrieval of data needed by the ERS from local campus systems. For cost sharing data, an outbound interface from the ERS to local cost-sharing systems will be needed. In addition to development of interfaces to obtain data from local campus systems on an ongoing basis, a one-time interface from the current A21/PAR system to initially populate the ERS database needs to be developed.

Deleted: access to local campus data needed by the ERS

Deleted: Effort Reporting System Rough Estimate.doc

Effort Reporting System Rough Estimate 20040130-TRG.doc

- Web presentation – development of html templates/jsp’s style sheets, graphics, etc. that constitute the visible web-based elements of the ERS
- Authorization Rules – development of structures of roles and the authorizations associated with different roles or data contexts (e.g., access to data based on an individual user’s department)
- Authorization Administration – development of the mechanism(s) for administering authorization rules.
- Web Navigation – development of “controller” components which direct navigation within the web space.
- Workflow – development of a mechanism for handling the step sequence of department administrator pre-review that can occur before individuals are asked to review/certify effort.
- Effort Report Generation – development of the mechanisms for the generation of effort reports under different data circumstances:
 - Standard Report – the basic effort report that will be reviewed/certified
 - Excpction Report– special effort reports for previously excluded or terminating employees (generated outside of the normal reporting/certification cycle).
 - Re-issuance – generatino of effort reports when changes in the planned effort or actual time reported meets the threshold for re-issuance and re-certification of an effort report.
- Notifications – development of the mechanism which identifies when notification criteria have been reached and which generates notifications to appropriate individuals that effort reports are ready for pre -review, are ready for review/certification, or have been certified.
- Effort Report Search/Selection – development of the mechanism to locate individual effort reports or groups of effort reports (general search, role -based, etc.)
- Online Effort Report Data Changes – mechanism for adding or changing effort detail on an individual effort report
- Online Certifications – development of the mechanism for online certification of effort reports
- Multiple Certifications – development of the mechanism for one individual to certify multiple effort reports.

Deleted: Effort Reporting System
Rough Estimate.doc

- Online Exception Data Collection/ - development of the mechanism for collecting data on individuals who received no pay from a sponsored project but are required to certify effort
- Edits – development of the edits associated online data entry/changes
- Reminders – development of the mechanism that provides reminders for needed effort report review and certifications.
- Compliance Monitoring Tools* – development of the reports for measuring current reporting period compliance and comparing with historical compliance data.
- Control/Audit Reports* – development of the various system-level control and audit reports (e.g., system access reports, transaction statistics) that gauge the volume and appropriateness of system use.
- General Reporting* – development of standard reports other than control/audit reports (definition of standard reports is still needed)
- Ad Hoc Reporting* – development of a mechanism to support ad hoc reporting if third-party tools cannot satisfy the need (examples of ad hoc reporting have yet to be defined).

Deleted: with incoming interface data as well as

* - Deliverables are only minimally defined in the requirements definition; further definition of the requirements for these deliverables will be needed before any realistic estimate (higher or lower) can be provided.

Testing

- Application Testing – the disciplined testing of the ERS to make sure that all components and associated logic perform as specified in the requirements and to check for good behavior of the system in those circumstances where use of the system occurs in ways that were never intended by the requirements. Includes testing in the different target campus operational environments to verify portability.
- Load/Stress Testing – a load stress/test to identify potential bottlenecks in the application code or database implementation such that these problems can be remedied before the code is released to campuses.

Deployment (Release)

Deleted: Effort Reporting System Rough Estimate.doc

Effort Reporting System Rough Estimate 20040130-TRG.doc

These activities cover the preparation of documentation, training materials, packaging of source code, etc., for the deployment of the ERS to campuses.

- Documentation – preparation of technical documentation describing the system, its components, installation, and operation
- Web-based User Training Materials (Generic) – preparation of a basic web-based user guide and training materials. These user training materials are intended to be generic in nature and serve as a starting point for campus development of training materials that take into account local business and technical detail.
- Technical Training – Training for campus technical staff about the mechanics of the developed ERS system, as well as local installation and operation. Includes preparation of training materials
- Deployment Packaging – preparation of the developed source code, installation instructions, test plans for campus installation verification, and related documents, and packaging of all of the materials for release to campuses.

Project Management

- Project Management – day to day technical project management, including detailed task planning, supervision of developers, monitoring of progress, problem resolution.
- Campus Coordination – coordination of campus staff participating in the resolution of issues related to clarification of requirements, addressing unanticipated system behaviors, system testing, etc.