

Release A CDR RID Report

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Priority	2

Section 5

Page NA

Figure Table NA

Category Name User and Performance Models

Actionee ECS

Sub Category

Subject ECS Performance Model Fidelity Deficiencies

Description of Problem or Suggestion:

Program Impacts:

- Inaccurate hardware resource sizing estimates for the ECS due to data-push errors in CDR Technical Baseline, incomplete representation of processing and disk access delays, and missing Release A workloads in the Performance Model
- Inaccurate estimates of system costs due to inaccurate resource estimates
- Performance degradation in the Data Processing Subsystem (and potentially the Data Server Subsystem) as a result of memory utilization not being modeled
- End-to-end response times are not collected; therefore, cannot determine whether performance requirements will be met

Problem Description :

The ECS Performance Model lacks functionality needed to determine the appropriate hardware sizing for Release A and beyond. This RID is based on both an independent analysis of the ECS models and the CDR presentation on 8/14 where HAIS stated that Release A standard products were included in the model, and a "look-ahead" to Release B was used to size Release A. The following areas are missing or incomplete:

1. The inputs to the Performance Model (from the user-pull model and the data-push model) are based on the CDR Technical Baseline (TB) dated June 21, 1995. This TB contains numerical and logical errors in the data-push area that affect the data that is input to the Performance Model (e.g., inconsistency between peak processing load represented in the processing summary spreadsheet and the volume timelines spreadsheet of the CDR TB for CERES), thus rendering the model predictions suspect. Moreover, little use is made of the user-pull information that is contained in the TB. The Performance Model assumes that user-pull requirements can be estimated to 2X the data ingest requirements (divided 50-50 between electronic and media distribution). This assumption may be incorrect as it is conceivable that a high volume user request could significantly degrade scheduled production.
2. Incomplete representation of Release A subsystems. The Data Management Subsystem, Advertising/Subscription Service of the Interoperability Subsystem, and the Planning Subsystem are not represented in the current model. Performance evaluation of

Originator's Recommendation

1. The product dependencies, file sizes, and processing requirements for all Release A and beyond (at least through Release B) must be made completely accurate and self consistent. Realistic user pull inputs to the Performance Model, based on stochastic user-modeling inputs must be used.
2. Modify the model to include representation of the Data Management Subsystem and Advertising Service of the Interoperability Subsystem.
3. Analyze memory utilization using a separate model based on the ECS System mode,l or by empirical experimentation on a representative system, like the EDF. These two approaches are described in the ECS Modeling Assessment Report (IV&V Deliverable 0506, 7/31/95).
4. Modify the model to also represent non-Production processing delays and disk access and transfer delays as discussed above and in the ECS Modeling Assessment Report (IV&V Deliverable 0506, 7/31/95).
5. Modify the model to include other (non-FCFS) service (i.e., process scheduling) disciplines (e.g., round-robin, shortest service time first,, priority) to determine how each affects system memory utilization and processing delays.
6. Add missing Release A workloads to the model. These are documented in the ECS Modeling Assessment Report (IV&V Deliverable 0506, 7/31/95).
7. Add statistics collection probes to the model so that end-to-end response times can be obtained and analyzed.

GSFC Response by:

GSFC Response Date

HAIS Response by: Mary Armstrong

HAIS Schedule 9/27/95

HAIS R. E. Mary Armstrong

HAIS Response Date 11/20/95

This RID addresses two topics: (1) the functionality and completeness of the ECS Performance Model; and (2) the accuracy of ECS models and analyses, given the available push and pull baselines.

Functionality of the ECS Performance Model:

The ECS Performance Model (implemented in BoNES) is not intended to be the only modeling tool used to provide ECS sizing estimates and to justify the choice of the hardware design. The focus of the Performance Model is on the Production and Data

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Functionality of the ECS Performance Model:

The ECS Performance Model (implemented in BoNES) is not intended to be the only modeling tool used to provide ECS sizing estimates and to justify the choice of the hardware design. The focus of the Performance Model is on the Production and Data Server subsystems, and the network that connects them. The model takes into account both the AHWGP baselined inputs and the user-pull technical baseline, in order to bound and refine the processing and staging requirements for these two subsystems.

Other strategies used to size hardware for individual subsystems, and to examine cross-subsystem performance, include benchmarking, analyses/trades, and static modeling (see also the response to PDR RID 394). Given the complexity of the BoNES model, as well as the time required to perform individual simulations, we do not believe that it is the best tool for representing the remaining subsystems, including Data Management, Advertising, and Interoperability. An "end to end" modeling approach (briefed at Release B IDR) is being used to develop a means of examining the total system under a number of operational circumstances. This approach involves developing a spreadsheet that captures benchmark and analytical results of key lower level operations on each host, and manipulating these by varying system loads in response to various scenarios.

Status	Closed	Date Closed	01/16/96	Sponsor	Daly
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***** Attachment if any *****
