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1. **Overview**

The Performance Action Team was formed in September 2007 to focus on CMS performance problems and to define and implement a Performance Management Plan. The objectives of the team were to:

- Clearly define CMS performance metrics
- Identify common performance measures and tools
- Identify performance problems and determine their root cause
- Identify problem resolution actions
- Maintain performance monitoring
- Provide continuous communication and manage expectations
- Clearly establish roles and responsibilities for continuous performance management
- Establish performance management as a CMS Central and campus responsibility

These remain the overarching objectives as this performance effort continues. However, it is time to review the progress and determine what succeeded, what work remains, and what direction this project and the team will take in the future.

2. **Successes**

**Communication**
- The team improved communications and installed a structure to manage performance issues.
- A performance-specific website was created and is the central repository for all performance related documentation.
- An organized Performance Management structure is established to respond quickly to campus and system-wide performance issues.
- Performance-related communications are done via bulletins to key campus constituencies.

**Documentation**
- A monthly report of performance ticket analysis results is posted to the website.
- Performance-related training materials are posted to the website:
  - Query management procedures
  - VERITAS I3 presentation
  - PeopleSoft PSPing utility
- Campus-developed aids are also posted:
  - Fresno – *Registration Cycle Analysis*
  - Long Beach – *Opening Week Processing Protocol*
• Performance analysis tools have been provided to campuses to assist with troubleshooting and periodic performance evaluation:
  o VERITASI3 – Provides campus access to historical data on performance
  o PS Ping – A basic diagnostic tool for identifying response time performance problems
  o Tracing Console – Improves the campus experience for providing data for performance ticket analysis

Performance Problem Reporting
• New performance problem definitions and reporting procedures have been developed and communicated to the campuses.
• Remedy enhancements for Performance ticket reporting were developed and implemented.
• More formal internal performance ticket handling procedures were implemented at CMS Central.
The result is that campuses are providing better information, and handling of tickets by CMS Central has improved which has led to better communication during troubleshooting.

Performance Management Procedures
• Analysis of performance tickets was instituted:
  o During the period of November 2007 through May 2008 122 performance tickets were opened of which 113 were resolved. The average is approximately 17 tickets per month.
• Analysis of performance problem ticket data has lead to improved troubleshooting procedures and improved the time-to-resolution of most problem tickets.
• Data archiving options have been investigated to reduce database size as a performance improvement measure.
  o The PAT received presentations from:
    ▪ IBM Princeton Softech
    ▪ Applimation
    ▪ HP Overbay
• PeopleSoft Data Archive Manager (DAM) functionality was investigated as a potential performance improvement activity. The team interviewed the University of Massachusetts Amherst to learn how they implemented and maintain DAM. Amherst had not implemented DAM to improve performance, just to reduce the size of the database. It was an approach that worked for them because there was only one database. The PAT recommendation is not to proceed with the effort for the following reasons:
  • The vendor does not support the functionality for upgrades
  • The solution is very manual and does not provide any immediate means to archive the data for future retrieval in an efficient manner.

3. Work Remaining
Definition of “Good” Performance and Performance Benchmarks
• The primary difficulty with assuring good performance is defining what “good” performance is. To this end, the Performance Action Team initiated a data collection project whereby campuses were asked to look at key on-line and batch processes and capture the number of transactions completed for a specified period of time. The expectation was that once we had accurate measures of transactions/time to work with, we would be able to do some subjective evaluation about how many transactions per hour/minute/second would be satisfactory to the end user. After many months of data
collection and analysis, the effort has not produced the desired outcomes. This was due to:

- Inconsistent data – The units of time were applied inconsistently and were difficult to normalize with any degree of confidence.
- Incomplete data – Some campuses provided numbers of transactions, but no time data. Others provided time data, but failed to provide the number of transaction completed.
- Variability of the campus environments – Because the campuses vary in size and operational complexity, and because they have to varying degrees modified their environments, normalization of the data is difficult.
- Even the most complete data represented only a snapshot in time so it is difficult to extrapolate meaningful conclusions.

4. Next Steps
The Performance Action Team has been established as a permanent CMS unit and will continue to investigate performance problems and develop recommendations for managing CMS performance into the future. This coming year, the PAT’s activities will include the following:

- The PAT will work this fall with the Campus Directors to identify better mechanisms for collecting data more consistently, and over more representative time periods.
- Performance management is a dynamic process that is a function of countless variables. For example, CMS Central must ensure that adequate compute resources are in place and that campuses are spread appropriately across the available computer clusters. From the campus perspective, adjustments can be made to improve performance by altering business practices during periods of anticipated peak transaction loads. At present there is inconsistent information regarding business calendars across the system. A master calendar is in the early development stages and should be completed this fall.
- Data archiving is thought to have significant value with respect to improving performance by reducing the size of databases that must be searched to complete a given transaction. The PAT has prepared a feasibility study in order to release an RFP for data archiving solutions. If the feasibility study is approved, the RFP should be released this fall.
- The need to re-cache servers after routine maintenance activities remains one of the greatest obstacles to ensuring consistent CMS performance. With this in mind, the PAT has established a task group to investigate pre-caching strategies, and by October 15 will develop a recommendation for addressing this problem.
- The inability of CMS Central to “see” performance from the end-user’s perspective is the single greatest obstacle to timely troubleshooting and maintaining end-user confidence in CMS. This fall, the PAT will partner with the Infrastructure Terminal Resources Project (ITRP) to identify and evaluate end-to-end performance management tools and develop recommendations for addressing this critical issue.

5. Conclusion
After one year, much work remains, but the CMS Performance Management project has:

- Increased understanding of, and attention to, the factors that impact CMS performance.
- Lead to improved troubleshooting methodology.
- Resulted in improved communication between the campuses and CMS Central.
- Helped increase campus awareness that performance is a system-wide responsibility.