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FAFSA 8.0 Performance Test Summary Presentation

December 30, 2003



Agenda

- Performance Test Planning
- Business Processes Tested
- Cycle Review
- Capacity Planning
- Proposed FAFSA 8.0 and ED PIN go live production environment
- Proposed FAFSA 8.0 and ED PIN peak production environment
- Major Issues Resolved
 - CSS
 - Mainframe
 - Other
- Open Issues
- Conclusion



Performance Test Planning

- There were 24 test cycles planned over a 3 month period.
- FAFSA 8.0 capacity estimates based on 30% increase of FAFSA 7.0 actual peak volume:
 - Number of concurrent users (26,000 peak/hour).
 - Number of applications submitted (~131,000 peak/day).
 - Number of CICS transactions (52 trans/sec on peak/hour).
- Performance testing validates estimates and identifies areas to tune the application, architecture, and infrastructure.
- Results from performance tests are extrapolated to determine production environment requirements.



Business Processes Tested

Twelve FAFSA 8.0 Business Processes have been successfully tested:

Fill Out a FAFSA	✓
FAFSA Corrections	✓
FAFSA Renewals	✓
FAA Renewals	✓
FAA Corrections	✓
W012 (Mainframe Edit and Submit)	✓
W030 (Mainframe Lookup)	✓
Request for Application Status	✓
Student Access	✓
PIN Registration	✓
PIN Authentication – Web Services	✓
ISIR	✓



Cycle Review

- Detailed description of all test cycles attached as Appendix A.
- Each trial details:
 - Hardware and Configuration Used
 - Business Process Tested
 - Goals
 - Summary of Results

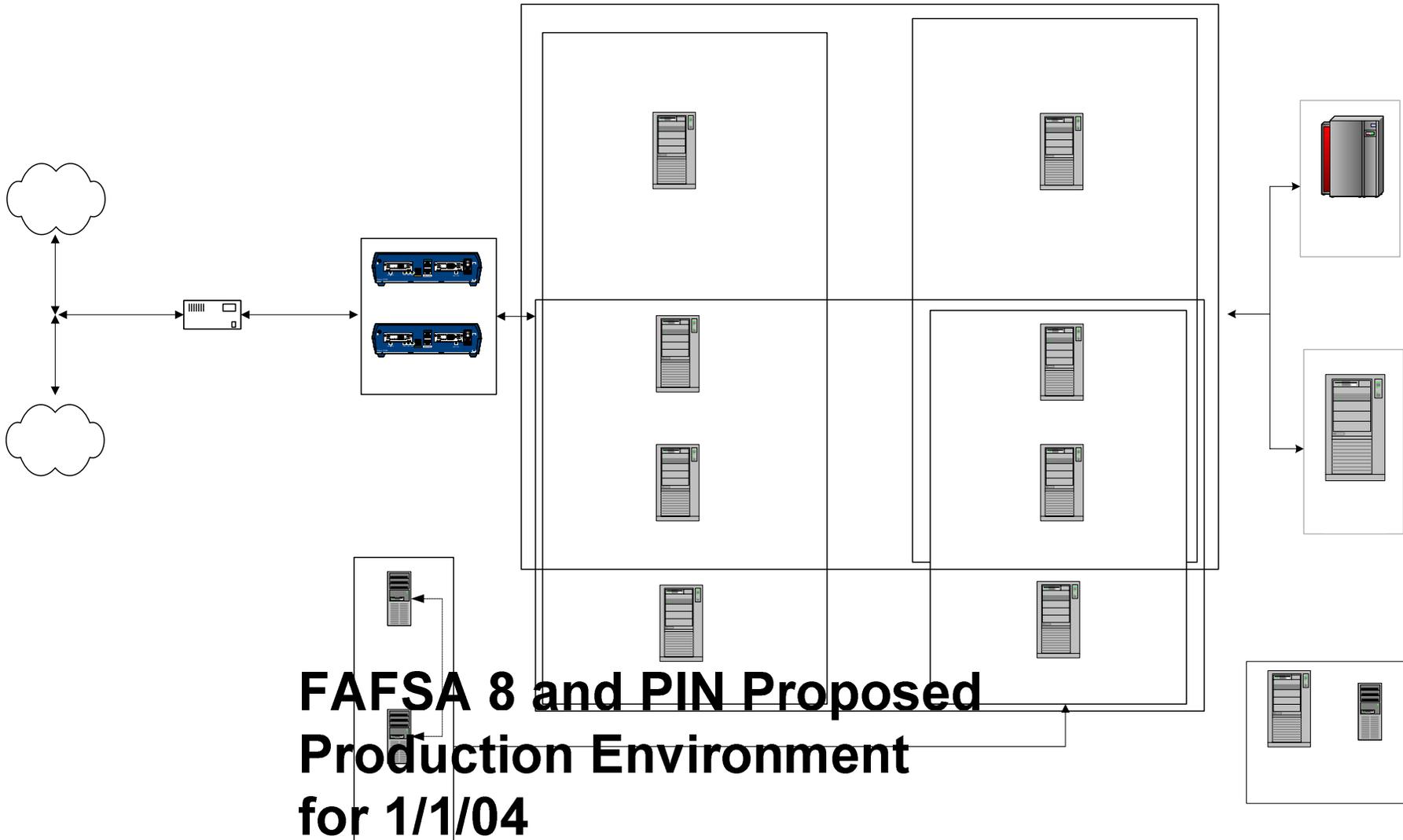


Capacity Planning

- Five test cycles dedicated to capacity planning for FAFSA 8.0 peak.
- Goals/targets were exceeded:
 - Peaked at 90 applications per min; 41% of Projected Peak Load.
 - Peaked at 16 CICS transactions per second; 31 % of Projected Peak Load
 - Achieved 65 CICS transaction per second with WebSphere MQ Load Test; 100% of Projected Peak Load.
 - Peaked at 3,000 concurrent users; 11% of Projected Peak Load.
- Extrapolated to support 6,000 concurrent users per application server
- Extrapolated to support 7,500 concurrent users per web server

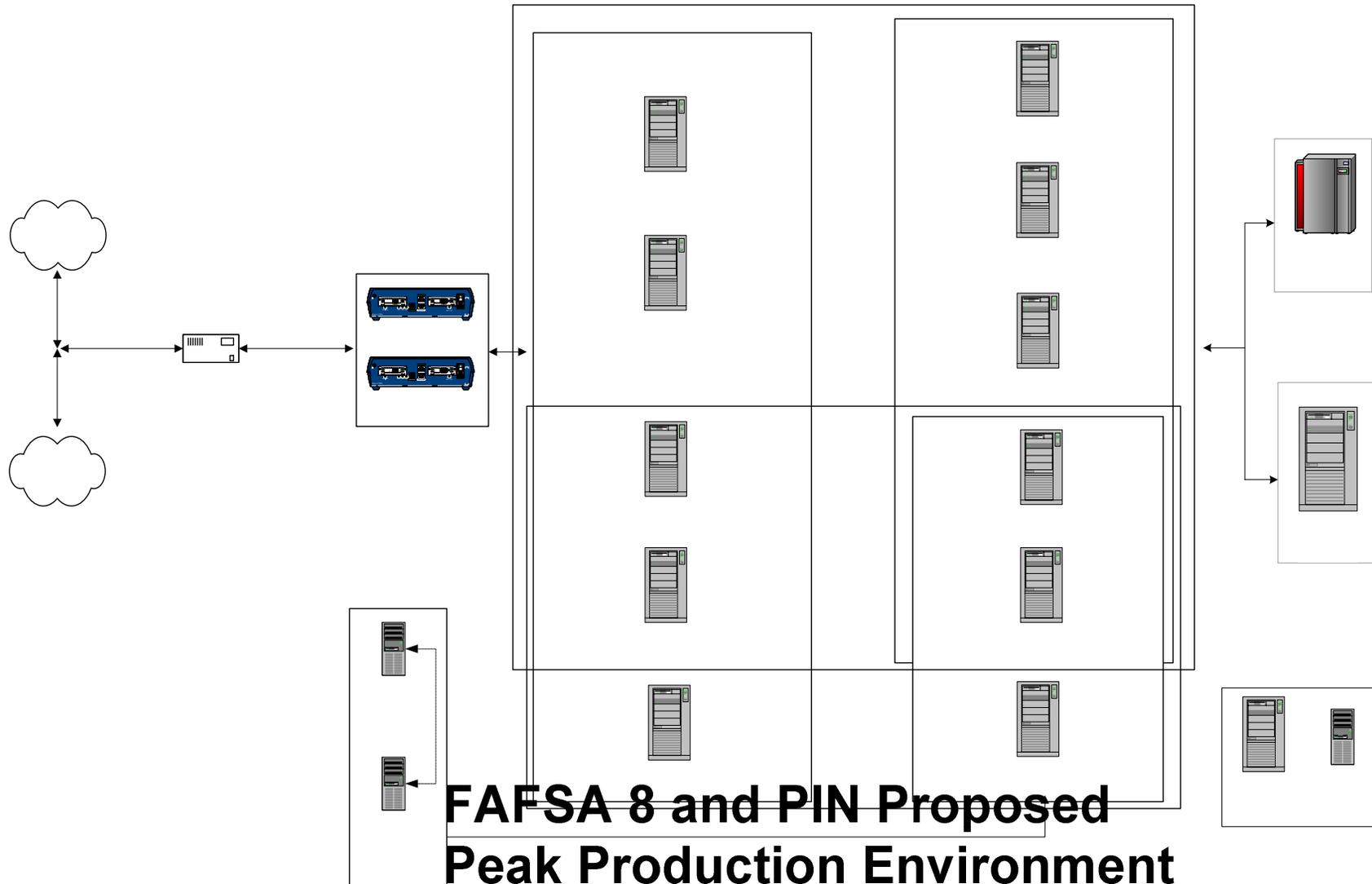


Proposed FAFSA 8.0 and ED PIN production environment – go live





Proposed FAFSA 8.0 and ED PIN peak production environment



**FAFSA 8 and PIN Proposed
Peak Production Environment
available 1/19/04**



Major Issues Resolved

Issue: CSS - Connections failed at various points in the application under load and failover of CSS or web server made the FAFSA performance site non responsive

Resolution:

- Approximately 80 hours dedicated to resolve CSS issues
- Cisco reported a known bug with Adaptive Session Redundancy (ASR) which limits the number of ports available for CSS
- ASR changed to Box-To-Box redundancy (Active/Passive)
- Tested application with 3000 concurrent users for 45 minutes and issue did not reappear
 - No problems occurred during remaining test cycles after redundancy change with 3000 concurrent users
- Decision made to go forward with CSS for FAFSA 8.0 production



Major Issues Resolved

Issue: Mainframe – CICS Region utilized 100% of CPU with less than 10 CICS transactions/second

Resolution

- Testing indicated that indexes had not been re-added to the DB2 database when created
- After indexes added, problem narrowed down to new MYAD module
- Code changes to MYAD slightly improved performance
- New indexes added to the DB2 database and the SQL in MYAD module was updated.
- Tested application and achieved 65 transactions per second with 40% CPU utilization



Major Issues Resolved

Other mainframe problems occurred in performance test environment

- TMON causing abends when super trace run during test
 - PTF applied to correct abends
- CKB4/CKB5 abends occurring in production and performance test environment
 - PTF applied to remove abends
- QPASA intermittently turning on and consuming majority of available CPU
 - PTF applied to reduce CPU utilization of process



Major Issues Resolved

Other Issues Resolved:

- Framing errors occurring during test
 - Corrected by moving Load Runner boxes from Bay 350 network to CAT 6000 network
- Cable change causing environment problems
 - Reset communication to full duplex on servers
- Sessions not invalidated in FAFSA Corrections business process
 - Application code change made to invalidate sessions correctly
- Errors experienced while including Akamai in performance test
 - Individual Akamai boxes overloaded during test
 - Environment not simulating production, Akamai removed from further testing

A complete issue log for FAFSA 8.0 included in Appendix A



Conclusion

- Twenty seven issues opened during FAFSA 8.0 performance test
- All performance test issues resolved during test cycles
- Performance Test of FAFSA 8.0 completed on schedule