

## Component 8 Installation and Maintenance of Health IT Systems Unit 8b

Troubleshooting; Maintenance and  
Upgrades; Interaction with Vendors,  
Developers, and Users

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## Performance Baseline

- Generated after completion of performance baseline testing.
- Shows normal operating parameters of your system under normal load conditions.
- Used to gauge overall system health & assist with isolating performance problems.

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## Performance Baseline: Testing

- “Benchmark testing”
- Compare performance of new server/system against standard (e.g., existing measurements or software specs).
- Test at regular intervals, when problem-free:
  - System resources (server & hardware)
  - Network architecture
  - Operating system
  - Database applications
  - Client applications

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## Performance Baseline: Utilities Available

- Work with vendor to determine best method for your EHR.
- Many third-party utilities available.
- Windows built-in utilities:
  - System Monitor (collect & view real-time data on usage of memory, disk, processor)
  - Performance logs & alerts
  - Task Manager
  - Event Tracing for Windows (ETW: trace & log events raised by user-mode applications & kernel-mode drivers; export most SQL Server events.)
- Databases often require special utilities.
- SQL Server built-in utilities:
  - SQL Trace
  - SQL Server Profiler
  - SQL Server Management Studio Activity Monitor
  - SQL Server Management Studio Graphical Showplan
  - Stored procedures
  - Database Console Commands (DBCC)
  - Built-in functions
  - Trace flags

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## Performance Baseline: Measurements & Next Steps

- Measurements
  - Peak vs. off-peak hours
  - Production-query, batch-command response times
  - Database backup and restore completion times
- Next steps
  - Compare baseline statistics to current server/system performance.
  - Investigate if numbers far above or below baseline.

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## EHR Maintenance & Upgrades

- Upgrades crucial for extending EHR functionality & overall system lifespan.
- Improperly planned/managed upgrade procedures can severely damage system, reducing performance.
- Use highly structured approach in upgrading any major, critical production system.

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## EHR Maintenance & Upgrades: Structured Approach

- Upgrade team
  - Works with vendor.
  - Reads upgrade documentation.
  - Analyzes functional enhancements.
  - Works with vendor on unknown variables.
  - Makes plan to configure & test affected applications.
- Technical team develops alternative testing environment (test bed).
- Upgrade team compiles pre-installation & installation checklists, determines downtime.
- After first testing, logs reviewed & errors/discrepancies reported to vendor.

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## EHR Maintenance & Upgrades: Structured Approach (cont'd)

- After vendor resolves issues, upgrade process retested, ensuring data integrity.
- Consider software to simulate workflow & users; track data for performance analysis.
- Unified spreadsheet to track issues.
- Once testing complete & upgrade approved, final documentation prepared & training scheduled.
- Installation team finalized & assigned roles.
- Upgrade scheduled during off-peak times.
- EHR "shadow copy" (read-only, without real-time interfaced results) accessible during upgrade.

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## EHR Maintenance & Upgrades: Structured Approach (cont'd)

- Upgraded system tested immediately after completion.
- Once testing complete, help desk notified & systems brought back online.
- Dedicated team available for several business days to resolve issues.
- (Follow similar processes for upgrades to server OS, workstation OS, databases.)

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## Client-Vendor Relationship

- Essential not only for successful implementation, but also for continued success of product.
  - Issues will arise beyond scope of your IT workforce.
  - Routine upgrades needed.
  - Vendor plays pivotal role in these & other events.
- Successful partnerships built on mutual goals, trust.
  - “In this together”.
  - Success of vendor depends on success of product.
- Long-term commitment between organization & vendor.
  - Relationship becomes complex once organization dependent on fully embedded EHR.

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## Client-Vendor Relationship: Before Purchase

- Understand vendor company & culture.
  - Visit headquarters, talk with as many as you can (including development & support).
  - Follow the money. What drives revenue stream?
  - Dependent on support fees? Understand support-fee structure.
  - Financially solvent enough to provide long-term support?
- Hosted solutions: understand vendor's upgrade strategy.
  - Will it conflict with your business practices?
- Impressions of vendor's support staff

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## Summary

- Performance baseline
  - Helps gauge system health & isolate problems.
- Structured approach for upgrades
  - Separate environment for testing upgrades prior to rollout. Work closely with vendor to resolve issues. Rollout during non-peak hours.
- Client-vendor relationship
  - EHR purchase brings long-term commitment. Complexity once dependent on EHR. Understand vendor & culture before purchase.

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## References

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  - <http://sqlserver-qa.net/blogs/perftune/archive/2009/07/26/5820.aspx>
- “Benchmarking Techniques Using T-SQL Part 1 - System Statistical Functions”, by Bill Wunder.
  - <http://64.29.220.154/articles/viewarticle.aspx?id=17797>

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