**7-3 Final Project: Milestone Three: Full Organizational Profile**

**Christopher Gray**

**IT-600**

**Southern New Hampshire University**

**Professor Michael Gallaher**



# IT 600 Final Project Milestone Three Template: Full Organizational Profile

**Directions:** For Milestone Three of your final project, insert your answers directly in the *Student Analysis* column below by doing the following:

* In each of the “Tech Description” fields, describe the GPOS feature using relevant technical terms and topic-related details.
* In each of the “Business Requirement” fields, describe (in business terms) how the absence of this GPOS feature impacts a business such as TSI.
* In each of the “Application Benefit” fields, describe the impact of this GPOS feature on the software applications that are typically run by businesses.
* In each of the “Implementation Tasks” fields, describe (in detail) how this feature would be implemented in a typical business back-office environment.
* See the instructions at the bottom of the document about the recommendation you will need to make.

**Note:** You can reuse the two criteria you completed in the Milestone Two (Tech Description and Business Requirement) to complement the new work in this milestone (Application Benefit and Implementation Tasks). Be sure to incorporate any instructor feedback you received on your Milestone Two submission.

| **GPOS Feature** | **Profile Criteria** | **Student Analysis** |
| --- | --- | --- |
| **Multiprogramming** | Tech Description | Multiprogramming allows multiple programs to run simultaneously by time-sharing the CPU (Knowledgehut.com, 2023). |
| Business Requirement | The absence of multiprogramming hinders multitasking, causing delays and reduced productivity for TSI's back-office. |
| Application Benefit | Improved CPU utilization by allowing multiple programs to be loaded into memory and executed concurrently. |
| Implementation Tasks | Memory management, process scheduling, context switching, and resource allocation. |
| **Multiprocessing** | Tech Description | Multiprocessing supports multiple physical processors (Garcia, 2023). TSI's lack of multiprocessing results in outdated hardware usage. |
| Business Requirement | The use of single-core processors limits performance and efficiency, impacting TSI's competitiveness. |
| Application Benefit | Enhanced performance by executing multiple processes on multiple CPUs or cores simultaneously. |
| Implementation Tasks | Inter-process communication, load balancing, synchronization, and managing shared resources. |
| **Multithreading** | Tech Description | Multithreading enables a process to execute multiple threads concurrently (Garcia, 2023). However, TSI lacks this feature. |
| Business Requirement | TSI's inability to handle concurrent tasks efficiently leads to hangs and reduced application capabilities. |
| Application Benefit | Improved responsiveness and resource utilization by dividing a single process into multiple threads that can run concurrently. |
| Implementation Tasks | Thread creation and management, synchronization mechanisms (locks, semaphores), and avoiding race conditions. |
| **Virtual Memory** | Tech Description | Virtual memory allows processes to use disk space as an extension of RAM, improving memory utilization (Tanenbaum & Bos, 2022). |
| Business Requirement | The absence of virtual memory causes frequent system crashes due to insufficient memory, impacting productivity. |
| Application Benefit | Efficient memory utilization by allowing processes to use more memory than physically available, using disk storage as an extension of RAM. |
| Implementation Tasks | Memory paging, page replacement algorithms, mapping virtual addresses to physical addresses. |
| **System Call Interface** | Tech Description | The system call interface provides functions for applications to request services from the OS kernel (Tanenbaum & Bos, 2022). |
| Business Requirement | The lack of a robust system call interface causes compatibility issues and instability in TSI's back-office. |
| Application Benefit | Provides a way for user-level processes to interact with the operating system kernel, requesting services such as I/O or memory management. |
| Implementation Tasks | Defining and managing system call functions, parameter passing, user-kernel mode transitions. |
| **Security** | Tech Description | Security protects system resources from unauthorized access (Technopedia.com, 2023). However, TSI lacks log-in, file system, and network security. |
| Business Requirement | Data breaches and unauthorized access pose significant risks to TSI's proprietary information and customer data. |
| Application Benefit | Protects data, resources, and processes from unauthorized access, ensuring confidentiality, integrity, and availability. |
| Implementation Tasks | Authentication, authorization, encryption, access controls, intrusion detection, and security policies. |
| **Device Drivers** | Tech Description | Device drivers enable the OS to communicate with hardware (Techtarget.com, n.d.), but TSI's custom drivers limit hardware compatibility. |
| Business Requirement | TSI's back-office struggles to adopt the latest hardware advancements due to limited driver support. |
| Application Benefit | Enables communication between the operating system and hardware devices, allowing software to utilize hardware functionalities. |
| Implementation Tasks | Writing drivers for different devices, handling device interrupts, managing I/O operations. |
| **Fault Tolerance** | Tech Description | Fault tolerance ensures system continuity in the face of failures (avinetworks.com, n.d.), but TSI lacks it, causing potential data loss. |
| Business Requirement | TSI's data is at risk, and downtime may occur due to hardware failures without fault tolerance. |
| Application Benefit | Ensures system reliability by designing mechanisms to handle and recover from hardware or software failures. |
| Implementation Tasks | Redundancy, error detection and correction, checkpointing, failover strategies. |
| *Recommendation: Your recommendation should map the technology you have described above to the overall requirements of TSI and their endeavor to implement TSO OS in their back office. Your recommendation should not be a simple regurgitation of the facts above.* ***Imagine you are presenting a summary of your findings and a recommendation to a busy executive.*** *Give a crisp, one-paragraph summary that defines how TSI will move from the current state to a future state that implements an operating system with all of the capabilities necessary to meet its requirements.*   | *Insert recommendation below* | | --- |   According to the findings of the investigation, TSI's existing operating environment is limited by the absence of important characteristics required for effective and secure business operations. To transition to a future state that meets TSI criteria, a complete operating system (OS) that includes multiprogramming, multiprocessing, multithreading, virtual memory, a robust system call interface, security mechanisms, device drivers, and fault tolerance is required. TSI may assure increased resource usage, improved performance, responsive multitasking, effective memory management, safe data handling, and uninterrupted operations even in the face of failures by implementing such an operating system. This pioneering move will enable TSI's back-office operations to reach better levels of efficiency, competitiveness, and resilience, establishing the company for long-term development and success in a rapidly changing technology context. | | |

References:

Multiprogramming Operating System: Types, Features & Examples. (2023). Retrieved 21 July 2023, from https://www.knowledgehut.com/blog/web-development/multiprogramming-operating-system

Fulber-Garcia, V. (2023, May 15). *Multiprocessing and multithreading*. Baeldung on Computer Science. https://www.baeldung.com/cs/multiprocessing-multithreading

Tanenbaum, A. S., & Bos, H. (2022). Modern Operating Systems (5th ed.). Pearson Education (US). <https://mbsdirect.vitalsource.com/books/9780137618941>

Operating System Security. (2023). Retrieved 22 July 2023, from <https://www.techopedia.com/definition/24774/operating-system-security-os-security>

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