MINUTES OF MEETING

• **Activity**	**BSRS Optimization Meeting with SageSoft Solutions**
• **Venue**	TESDA Command Center, TESDA Complex, Taguig City
• **Date/Time**	February 19, 2025, 10:00 AM to 11:00 AM
• **Attendees**	**ICTO - BSRS TEAM** 1. Jotham Hernandez 2. Cristian G. Legaspi 3. Zander Roi Tabelona 4. Mark Lumongsod **SAGESOFT SOLUTIONS** 5. JC Constantino 6. Richtmond Lopega 7. Jeffrey Alvarado 8. Joseph Era

• **Background Information**

As part of the ongoing enhancement of the BSRS, efforts are being made to optimize the system to ensure superior performance and efficiency for all TVET learners.

SageSoft Solutions offers a comprehensive approach to system optimization by providing valuable insights and performance assessments. Their expertise ensures the system remains reliable, efficient, and well-maintained. By enhancing server and application optimization, this solution minimizes downtime and significantly improves the overall effectiveness of the BSRS.

Topics	Highlights/Agreements
1. Introduction	Mr. Jotham Hernandez, Information Technology Officer I of the ICT Office, began the presentation by outlining the existing BSRS Infrastructure.
2. Discussion on the BSRS Optimization	**1. Optimization of the Server and Application** **Current Limitations** • By default, Linux only handles 500 network connections • The default port range (ip_local_port_range) is set too low, leading to connection exhaustion. • If overloaded, the load balancer triggers and receives 504 Internal server errors.

Proposed Optimization

- Increase ip_local_port_range to 65000-1050 to allow up to 1065 concurrent connections.
- Enable keep-alive connections with a timeout of 30 seconds.
- Use Apache Benchmarking to test server performance under load before cloning the server.
- Adjust it to the System Control Settings to persist across reboots because the settings are a VM file by default and all data is automatically erased if reboots.

Here are the steps to check the network limits in Linux and analyze the maximum allowed requests:

1. List Available IPv4 Network Parameters

   ls /proc/sys/net/ipv4

2. Check the Local Port Range

   cat /proc/sys/net/ipv4/ip_local_port_range

3. Find Specific Limits in Configuration Files

   grep '32768' /proc/sys/net/ipv4/*

4. Calculate the Maximum Allowed Requests

   60999 - 32768 = 28231

   28231 / 60 ≈ 470 requests per second

5. Impact on Load Balancer

   If the request rate exceeds this limit, the load balancer may return HTTP 504 Gateway Timeout or 502 Bad Gateway errors due to exhausted available ports.

2. Database Partitioning Strategies

- Large partition tables (≥1GB) should be partitioned using hashing or index-based partitioning (e.g., partition by year: P1 = 2024, P2 = 2023).
- Use WHERE clauses based on Year to enhance query performance.
- Optimize query execution plans with low-order queries

	and chunk-based data retrieval to minimize IOPS overhead. • Index key fields to avoid full-table scans. • Monitor the risk management queue to identify bottlenecks. • Optimize tables to reduce unnecessary auto-scaling and excessive RAM usage. **3. Server Performance Monitoring and Benchmarking** **A. Commands for Real-Time Monitoring** • **htop** – Check CPU and RAM usage. • **vmstat** – Analyze memory usage and system performance. • **ss -top | grep 'wait'** – Monitor waiting connections. • **ss -top | grep 'fin'** – Identify terminated connections. • **ss -top | grep 'ESTAB' | wc -l** – Count active connections. **B. CPU/RAM Management:** • If the payload is light and only involves requests (no heavy processing), lower CPU/RAM while maximizing request limits. • If heavy processing is required (e.g., in RDS), increase CPU and RAM accordingly.
• **Actions to be Taken**	The BSRS Team will conduct an initial investigation of all configurations inside the infrastructure of the BSRS most importantly the ff: 1. Increase the ip_local_port_range 2. Enable keep-alive connections 3. Implement table partitioning 4. Monitor using htop, vmstat 5. Optimize ELB and auto-scaling setting
• **Adjournment**	With no other matters to discuss, the meeting was adjourned at 11:45 AM

Prepared by:		
CRISTIAN G. LEGASPI Information System Analyst II, ICTO-ITPMD	**ZANDER ROI TABELONA** Computer Programmer III, ICTO-ITPMD	**MARK B. LUMONGSOD** Computer Programmer III, ICTO-ITPMD
Reviewed by:		
PATRICK NEIL NOCEJA Information System Analyst II, ICTO-ITPMD	**JOTHAM M. HERNANDEZ** Information Technology Officer I, ICTO-DISAU	**HEIDI I. FORTE** Information Technology Officer III, ICTO-ITPMD
Noted by:		
VINCENT ALJON A. CIFRA, CESE Executive Director IV Information and Communication Technology Office		

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BSRS AWS Architecture Meeting

February 19, 2024 | Executive Room, TESDA Command Center, Taguig City

NO	OFFICE	NAME	DESIGNATION	SIGNATURE
1	Sagesoft Solutions Inc	JC constantino	Solutions Architect	
	SAGESOFT SOLUTIONS INC.	RICHMOND D. LOPEZ	TECH SUPPORT	
	"	JEFFREY ALVARADO	Business Dev't Specialist	
	"	JOSEPH ERA	Project Delivery Head	
	TESDA	CRISTIANO VECARRI	ISA II	
	TESDA	Zander Rei Tabelona	Com Prog III	
	TESDA	Mark Lumangsod	Com Prog III	
	TESDA	Jatham Hernandez	ITO I	

Noted by:

VINCENT ALJON A. CIFRA, CESE
Executive Director, ICT Office