**Proposed Hardware and Security Configuration for PRAPTI**

**Introduction**

This document provides the recommended hardware and security configuration for the new application that will replace the client’s existing system. The new solution will be developed using React for the front-end (web and mobile), Spring Boot for the back-end, and PostgreSQL as the database on Windows Server OS.

The configuration has been designed keeping in mind the current user base, the expected growth in the next three years, and the performance and security requirements defined by the client.

**Assumptions**

**Frontend**: React (web + mobile app)

**Backend**: Spring Boot Microservices

**Database**: PostgreSQL

**Operating System**: Windows Server 2022 (64-bit)

**Current user base:** 1,670

**Expected user base in 3 years**: 3,000

**Peak concurrency**: 200 users

**Daily transactions**: ~50,000

**Application Server (Spring Boot + React)**

**Recommended specifications:**

**CPU**: 8 vCPUs (scalable to 16)

**RAM**: 32 GB

**Storage**: 500 GB SSD (NVMe preferred)

**OS**: Windows Server 2022 Standard (64-bit)

**Network**: 1 Gbps NIC, scalable to 10 Gbps

**Database Server (PostgreSQL)**

**Recommended specifications:**

**CPU**: 16 vCPUs (scalable to 32)

**RAM**: 64 GB (recommended to plan for 128 GB considering future growth)

**Storage**: 2 TB SSD in RAID-10 configuration

Separate disk for WAL (write-ahead logs)

**OS**: Windows Server 2022 Standard (64-bit)

**Backup**:

Daily incremental backup

Weekly full backup

Three-layer backup: (1) on-server, (2) DR site, and (3) hardware backup (external storage/tape/cloud)

Replication: Read-replica for reporting and analytics

**Disaster Recovery Setup**

To ensure business continuity, a DR environment must be established with the following:

**Database DR Server**: Same configuration as production DB

**Application DR Server**: 8 vCPUs, 16 GB RAM, 500 GB SSD

**Replication**: Near real-time data sync between production and DR

**Staging Environment (for VAPT and Testing)**

A dedicated environment is required for security testing and staging:

**CPU**: 4 vCPUs

**RAM**: 16 GB

**Storage**: 200 GB SSD

This server will be used for Vulnerability Assessment and Penetration Testing (VAPT) before any release is deployed to production.

**Security and Network Layer**

To safeguard user data and comply with enterprise security standards, the following components are recommended:

Load Balancer with Web Application Firewall (WAF)

Next-Gen Firewall (NGFW) with Intrusion Prevention/Detection

SSL Certificates (TLS 1.3)

Antivirus and endpoint protection for servers

Firewall rules

**Deployment Setup**

**Development & Testing**: 4 vCPUs, 16 GB RAM, 200 GB SSD

**UAT**: 8 vCPUs, 32 GB RAM, 500 GB SSD

**Production**: As per application and database server recommendations

**DR Setup**: Separate app and DB servers as described above

**Staging**: For VAPT and testing

**Future Scalability**

The solution has been designed to scale in line with future requirements.

If concurrency exceeds 500 users, additional application nodes can be deployed behind a load balancer.

PostgreSQL clustering (Patroni/pgpool-II) can be considered if database load increases significantly.

A Redis cache layer can be introduced to optimize session handling and frequent data lookups.

**Summary of Recommended Configuration**

|  |  |  |
| --- | --- | --- |
| **Component** | **Initial** **Specs** | **Future** **Scalability** |
| Application Server | 8 vCPUs, 32 GB RAM, 500 GB SSD | Add additional nodes if concurrency > 500 users |
| Database Server | 16 vCPUs, 64 GB RAM, 2 TB SSD (RAID-10) | Scale up to 32 vCPUs, 128 GB RAM |
| Disaster Recovery (DR) | DB Server (same as production), App Server: 8 vCPUs, 16 GB RAM, 500 GB SSD | Near real-time replication for failover |
| Staging (VAPT) | 4 vCPUs, 16 GB RAM, 200 GB SSD | Scale vertically if more load is required |
| Dev / Test / UAT | 4–8 vCPUs, 16–32 GB RAM, 200–500 GB SSD | Scale vertically as needed |
| Network | 1 Gbps NIC, Load Balancer | Upgrade to 10 Gbps if required |
| Security | SSL Certificates, WAF, NGFW, Antivirus | Cloud-based auto-scaling security |