UNITED STATES INTERNATIONAL UNIVERSITY OF AFRICA

DST 4010

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**Hospital System Requirements**

**System Architecture** : Client-Server with Hybrid Cloud (backup/DR/analytics)

1. ***Availability & SLAs***

- EPR core: should be available at least 99.95% annually (≤ 0.05% downtime/year).

- Monitoring & Nurse Call : should be available at least ≥ 99.999% within LAN.

- Branches to HQ connectivity: each branch link available ≥ 99.5%.

1. **Performance & Latency**

- LAN device <--> edge gateway RTT ≤ 5 ms.

- Branch <--> HQ typical WAN RTT ≤ 100 ms.

- Monitoring ingestion pipeline sustained rate = X events/sec (set from device inventory).

- Concurrency control: serializable isolation for medication orders.

-Ingest telemetry at required device rates (example: 1 sample/sec per bedside monitor, replace with inventory numbers).

- Local edge rules evaluate alarms in ≤1s; critical alarms must notify nurse stations within 3s.

- Telemetry buffered locally for ≥24 hours when WAN down.

1. **Recoverability (RPO/RTO) & BACKUP**

**Monitoring & Nurse call** : RPO = 0s (local buffer), RTO ≤ 5 minutes.

**EPR:** RPO ≤ 15 minutes, RTO ≤ 60 minutes.

**Full site failover to cloud DR** : RTO should be less than 4 hours .

- Nightly full backup + continuous incremental replication to cloud.

1. **Security & Compliance**

- Role-based access control (RBAC) plus attribute checks (ABAC) for patient-level access.

- MFA required for clinical staff performing medication/orders.

- TLS 1.3 for all transport; AES-256 at rest.

- Annual third-party penetration test, quarterly vulnerability scans.

-Audit every read/write with immutable timestamped record.

1. **Scalability & Capacity**

- System must scale to +50% device/user growth without redesign.

- Autoscaling triggers for app tier at 70% CPU or 75% request latency SLA.

1. **Maintainability & Operability**

- CI/CD pipelines for app releases; automated smoke tests on deploy.

- Prescription signing requires clinician authentication + electronic signature.

**Each server should have at least the following requirements**

**App servers**: 3 × (16 vCPU, 64 GB RAM, 2 TB NVMe) — active/active + autoscale.

**DB Cluster**: PostgreSQL/Oracle HA — 3 nodes, synchronous local replication.

**Time-series DB:** TimescaleDB or InfluxDB cluster for telemetry.

**Storage**: Enterprise SAN or NAS with SSD tier + S3-compatible backup target (MinIO or cloud S3).

**Network DIagram**

