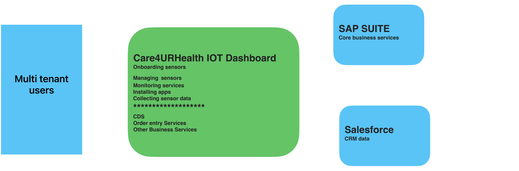
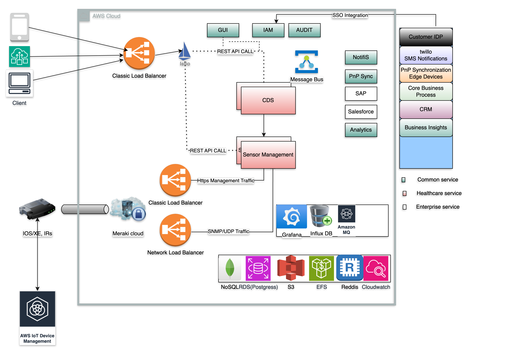
**Care4URHealth Ecosystem Platform**

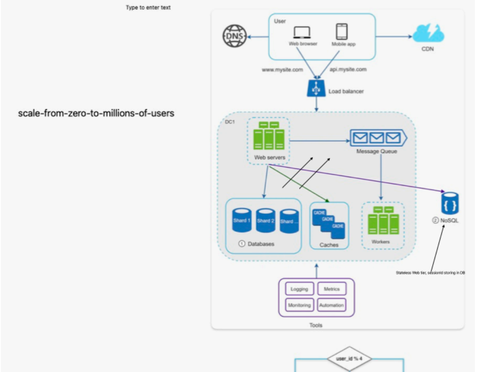
- Care4URHealth, a successful life sciences and healthcare company, specialises in wearable technology and smart health IoT devices.
- To build a cloud-based scalable and secure Healthcare Software-as-a-Service (SaaS) Platform (HSP) for delivering healthcare information services.
- Analysed the architectural requirements of a HSP(basic functional services, Clinical Decision Service (CDS), onboarding health monitored devices(plug n play), seamless collection of sensor data, storing capabilities.
- AWS cloud computing EC2 or EKS can be leveraged
- We can draw a Landscape Diagram at this point to know the system as a broad view.

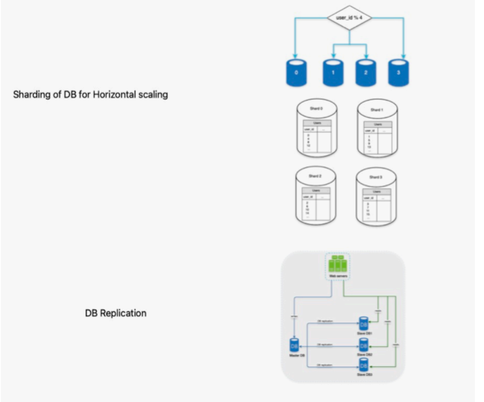


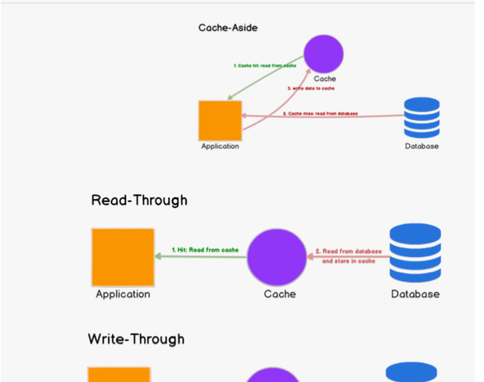



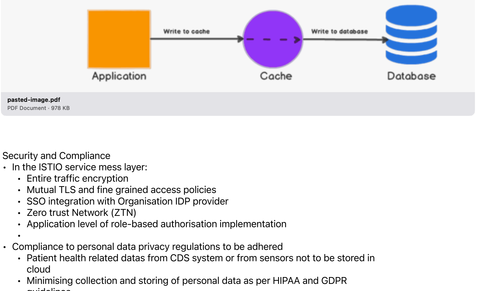

- AWS Cloud hosted solution, using EKS, RDS, S3, Amazon Reddis Cache.

- Scaling and cache strategy discussed quickly in the following diagram.
- RDBMS used for patient doctor related transactional data storages
- NoSQL (Mongo) used to store session data to avoid sticky session issues.
- Mongo to be used for unstructured sensor datas, still to have low latency(need to handle serialise and deserialise JSON
- Load Balancer used to distribute incoming traffic among servers
- Database replication to have better performance(write update in master nodes, read operations distributed across slave nodes).
- Obviously application performance largely depends on right usage of caching. Different strategies discussed here
- Eviction policy (LRU, LFU, FIFO) matter of consideration.
- Stateless web tier, storing session data in NoSQL schema.
- Setting up multiple data centres (users are geoDNS routed, routed to nearest data centre)
- Replication among data centres a matter of consideration
- Logging and Metrics
  - Monitoring error logs through Kibana. Influx timeseries DB can be used.
  - Application performance metrics through Grafana.
- Host level metrics (CPU Utilisation, Memory, disk I/O etc.
  - Aggregated level of metrics for entire database tiers, cache tiers etc.
  - Key business metrics: daily patient logging, doctors activities, each patient's related sensor data dashboards to know the patient profile.
- CICD Pipeline setup for build and automation
- Database horizontal scaling (Sharding).
- Analytics component build on data warehousing to Snowflakes and Databricks.

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Security and Compliance

- In the ISTIO service mess layer:
  - Entire traffic encryption
  - Mutual TLS and fine grained access policies
  - SSO integration with Organisation IDP provider
  - Zero trust Network (ZTN)
  - Application level of role-based authorisation implementation
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- Compliance to personal data privacy regulations to be adhered
  - Patient health related datas from CDS system or from sensors not to be stored in cloud
  - Minimising collection and storing of personal data as per HIPAA and GDPR guidelines.
  - Regular audits and compliance monitoring
  - There are many other aspects.