

AWS Architecture Document for Alchem Pharma (af-south-1 & ap-south-1)

- **Project Scope:** CRM, Sales, Purchase, Inventory, HRMS
- **Cloud Provider:** Amazon Web Services (AWS)
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1) Region & Access Strategy

Purpose	af-south-1 (Cape Town)	ap-south-1 (Mumbai)
Primary Region	Africa (Cape Town) – af-south-1	Asia Pacific (Mumbai) – ap-south-1
Notes	Lowest Response Time for Burundi users (~50–80 ms); all primary workloads run here.	Cost-efficient; higher Response Time for Burundi users (100–150 ms); low Response Time for Pune admins (20–30 ms).
Admin Access	Pune, India	Pune, India
Admin Notes	Admins access via IAM Identity Center (SSO) and office/VPN IPs. Higher Response Time from Pune (~120–150 ms).	Admins access via IAM Identity Center (SSO) and office/VPN IPs. Low Response Time from Pune.

3) Technology Stack (Identical for Both Regions)

Layer	Technology
Frontend	Angular (packaged into .war or static build for Nginx)
Backend	Java (packaged .war)
Web/App	Nginx + Apache Tomcat on EC2 t3.medium (Amazon Linux 2 / Ubuntu LTS)
Database	PostgreSQL or MySQL on EC2 t3.large
Code Sharing	Amazon EFS (mounted across ASG EC2 instances for WAR/code sharing)
SSL/TLS Optional	Paid SSL Certificate (~\$24 USD ≈ ₹2,000 INR/year)
OS	Amazon Linux 2 or Ubuntu LTS
Management	Webmin on App EC2 (hardened and IP-restricted)
Monitoring	Prometheus + Grafana + CloudWatch

4) Estimated Monthly Cost

Note :- Actual billing may vary with usage, taxes, or data transfer.

Category	Spec	af-south-1 (USD/mo)	ap-south-1 (USD/mo)
EC2 – Web/App	t3.medium	\$36.21	\$32.70
EC2 – Database	t3.large	\$72.42	\$65.41
EBS (gp3)	App: 80 GB, DB: 120 GB (200 GB total)	\$16.00	\$14.00
EFS (One Zone)	Shared code storage (~50–80 GB, 65 GB midpoint)	\$10.40	\$9.75
S3	Artifacts, logs, backups (~60–80 GB + lifecycle)	\$5.00	\$4.00
CloudWatch	Basic metrics (10) + 5 alarms	\$3.50	\$3.50
Prometheus + Grafana	Self-hosted on App EC2	\$0	\$0
AWS Backup/Snapshots	Weekly AMI + daily EBS snapshots (20 GB/week, 4 weeks)	\$4.00	\$3.60
Data Transfer Out	30–50 GB (40 GB midpoint)	\$5.20	\$3.60
SSL Certificate Optional	Paid SSL (~\$24/year)	\$2.00	\$2.00
Total Resources Charges		\$154.73	\$134.56
GST 18%		Depends on the AWS Bill	Depends on the AWS Bill

5) Detailed Architecture (Identical for Both Regions)

5.1 Compute

Web/App EC2

- **Instance:** t3.medium (2 vCPU, 4 GB RAM)
- **AMI:** Ubuntu 22.04 LTS
- **Software:** Nginx (reverse proxy, static), Tomcat (WAR hosting), Webmin (restricted), Prometheus Node Exporter, Grafana
- **Storage:** 80 GB gp3 EBS (/ , /var/log, /opt/apps). WAR files deployed under /opt/apps.
- **Networking:** Public subnet with Elastic IP (optional); Security Group allows 80/443 from 0.0.0.0/0, SSH (22) from Pune/VPN IPs only.
- **EFS Mount:** Shared EFS mount point at /opt/code for application WAR/code files across ASG instances.

Database EC2

- **Instance:** t3.large (2 vCPU, 8 GB RAM)

- **Engine:** PostgreSQL or MySQL (InnoDB)
- **Storage:** 120 GB gp3 EBS (80 GB data, 40 GB logs)
- **Networking:** Private subnet; DB accessible only from Alchem Pharma corporate network CIDR, Tej IT corporate CIDR (VPN/VPC peering enforced).
- **Backups:** EBS snapshot schedule + logical dumps to S3.

5.2 Storage & Backups

- **EBS (gp3):** App 80 GB, DB 120 GB (200 GB total).
- **EFS:** ~50–80 GB (One Zone), mounted on App EC2(s) for code/WAR sharing.
- **S3 Buckets:**
 - `s3://alchem-static` – static assets/artifacts
 - `s3://alchem-backup` – DB dumps, logs, AML/metadata
 - **Lifecycle:** Logs → S3 IA after 30 days; Glacier after 90 days.
- **Snapshots:** Weekly AML of App & DB; daily EBS snapshots for DB volume (20 GB/week); 30–45 days retention.

6) Comparison Summary

Aspect	af-south-1 (Cape Town)	ap-south-1 (Mumbai)
Total Cost (Validated)	\$154.73	\$134.53
Burundi Response Time	Low (~50–80 ms)	Higher (~100–150 ms)
Pune Admin Response Time	Higher (~120–150 ms)	Low (~20–30 ms)
Optimizations Needed	Savings Plan, reduce EFS	Optional CloudFront