

The background features a vibrant blue gradient with subtle, wavy horizontal lines. In the bottom right corner, there is a colorful abstract shape with shades of purple, pink, orange, and red.

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BUILD004

Scaling citizen platforms to impact lives of billions of Indians

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Agenda

- India as Innovation Hub
- Key tenets of citizen scale platforms
- How India's citizen scale workloads leveraged AWS
- Key learnings
- Customer case study – Common Services Center

India stack – Digital public goods



Powering the world's largest vaccination drive

Objective

To facilitate seamless appointment scheduling, verification, and certification for Covid-19 vaccination of 130+ crore Indians

Salient Features

- Provides **low latency** user access for healthcare practitioners
- Maintains consistent performance at a **national scale**
- Scales up and down **without interruption** to spikes in traffic
- Delivers **disaster recovery** capability
- **Minimizes** operational and support overhead



Key tenets of citizen scale platforms



Security



Availability



Performance



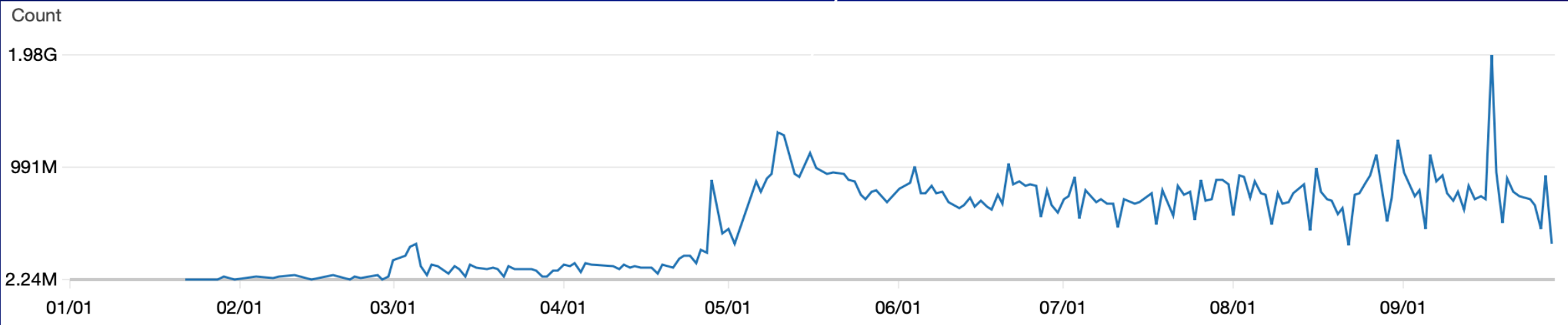
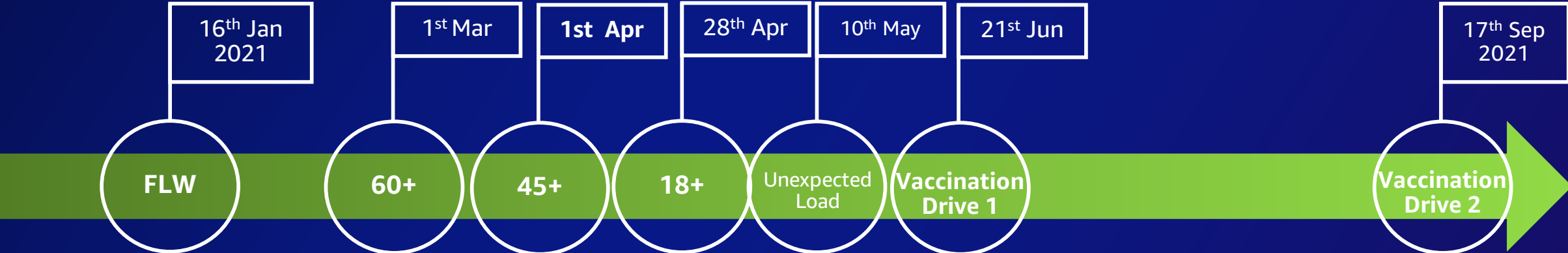
Scalability



Resilience



CoWIN's journey of scalability



hits per day at API gateway scaling from 2M/day in January to 1.2B/day (May).

Usage of fully managed service, no dependency on manual scaling

Best of the cloud engineers on stand-by to monitor the scalability and performance.

Transaction Trends:

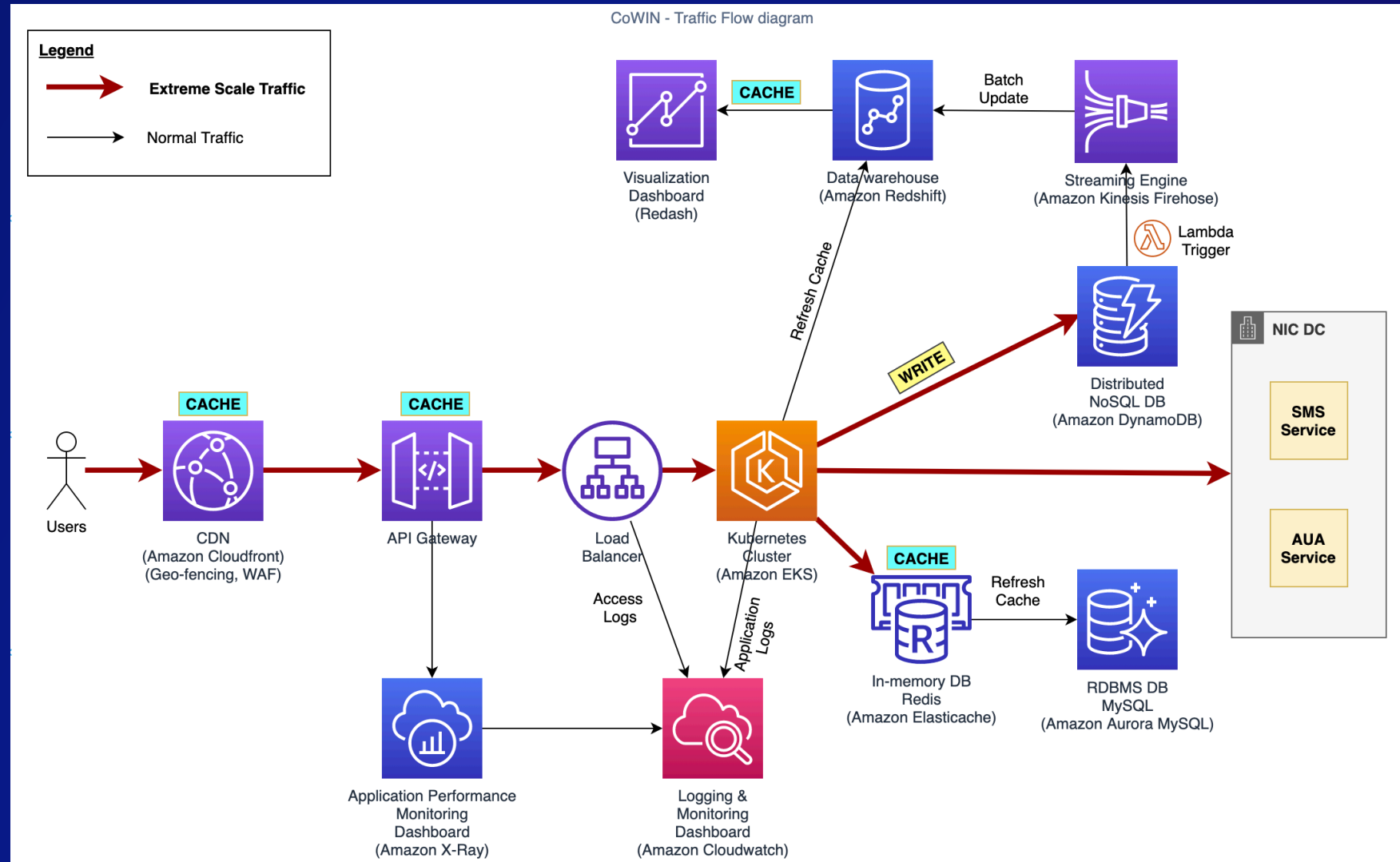
- Off hours: 20 TPS
- Normal Day: 20,000 TPS peak
- Events: 150,000 TPS peak

Cloud Transactional NoSQL DB:

- 600+ partitions (nodes)
- Billing per read/write
- Auto-pilot mode scaling
- Data written to 3 DC, 6 copies
- Single-digit millisecond latency
- 99.99% SLA

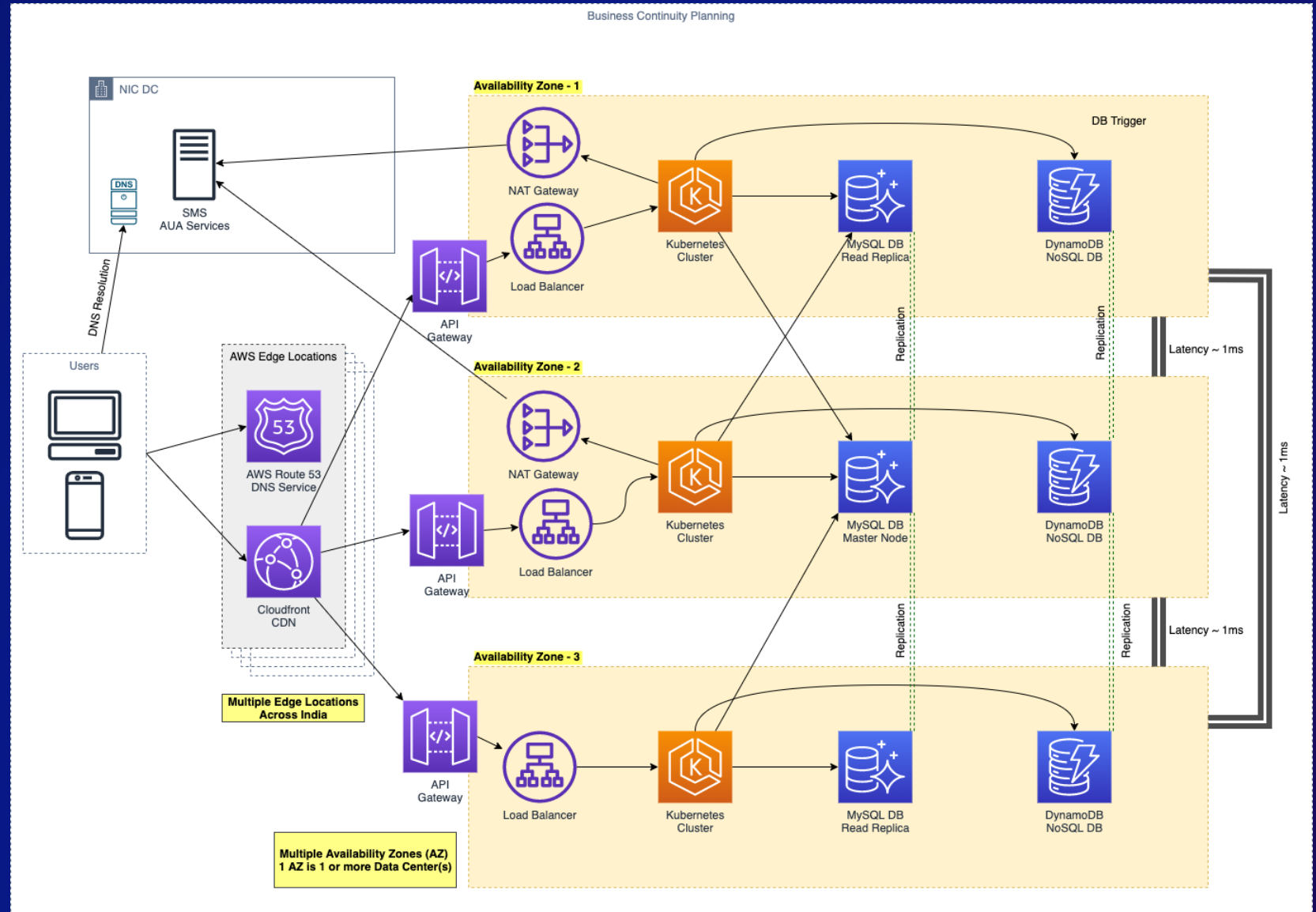
Avoided Traditional DB challenges:

- Upfront compute to provision 600 node database cluster
- DB licenses for 600 node
- DBA to manage/scale cluster
- Replication of data to DR site
- Performance, reliability tuning



Business continuity planning: Multi-AZ Active-Active Architecture

- ✓ No single point of failure across compute, storage, networking, security layer
- ✓ Using 3 datacenter sites far apart to mitigate both man-made and natural disasters(floods, earthquakes, attacks etc.)
- ✓ Zero data loss in case of DC/DR Failure
- ✓ Always on DR Architecture with no dependency on DR drills



How AWS helped the Application team?

- Managed services allowed development team to **focus on business functionality without worrying about scale, availability, reliability** concerns.
- **No manual efforts** of managing VMs, software installation, high availability, data replication across DC/DR.
- **No need of pre-estimation** of compute infrastructure.
- **No perpetual licenses** to be procured
- **Agility** to get 1000s of VMs, any combination of application component stacks within few minutes using **Infrastructure as Code** templates.
- Templates can be used to replicate multiple environment, **global deployments of CoWIN** across countries without any manual deployment efforts.

CDN

- Caching @ Edge
- Anti-DDoS

API Gateway

- Rate-limit per user/application
- App performance monitoring
- Throttling to avoid downtime

Load Balancer

- Traffic distribution across 3 DC
- SSL Termination

Kubernetes

- Application Micro-services
- Auto-scaling

Databases

- NoSQL transactional distributed database DB
- RDBMS - Master/admin data

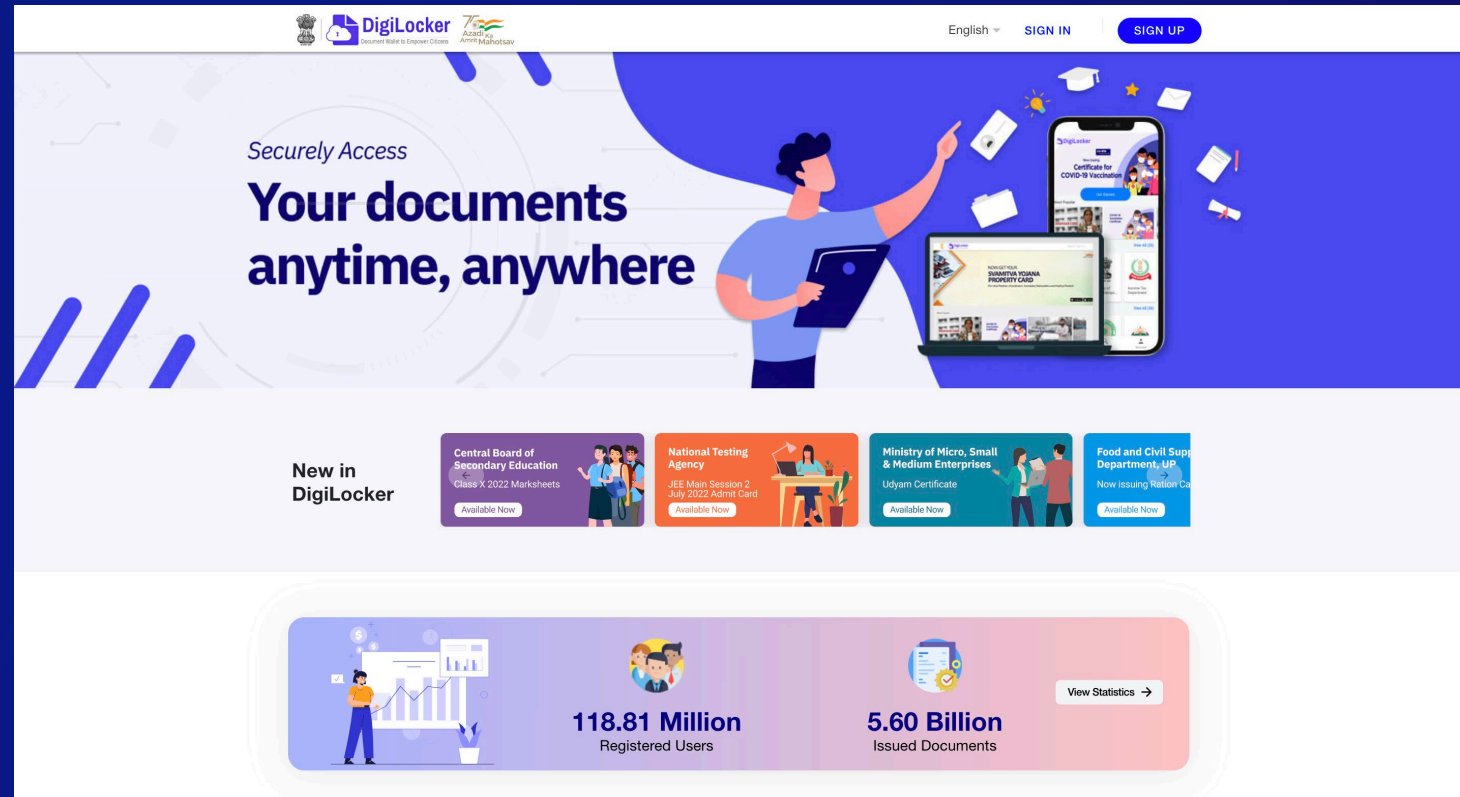
Analytics

- Data stream
- Data warehouse
- Dashboard

DigiLocker

35TB of Filesystem, MongoDB and application instances were migrated to AWS in a timeframe of 6 months

1. 118.8M registered users
2. Large files stored on file system
 - Scalability
 - Cost
 - Reliability
3. API Ecosystem
4. Build on Open Source
5. Microservices Architecture
6. Huge traffic during CBSE results



eSanjeevani helpline offers critical telemedicine services

Challenges

Following the COVID-19 outbreak, the outpatient departments (OPD) at hospitals shut down, and there was an urgent need for access to doctors.

Solution

C-DAC in partnership with AWS created the eSanjeevani solution on AWS services such as Amazon RDS, Amazon Simple Queue Service (SQS), and Amazon S3

Benefits

- Helpline handles about 4,000 consultations per day
- Helpline crossed over 300,000 teleconsultations in 23 states

“eSanjeevani is being implemented at over 155,000 health and wellness centers in the country under Ayushman Bharat Scheme, the world’s largest health insurance scheme.”



Company: Centre for Development of Advanced Computing (C-DAC)

Industry: Public Sector

Country: India

The Centre for Development of Advanced Computing or C-DAC, under the Ministry of Electronics and Information Technology (MeITY MyGov), built the eSanjeevani OPD line.

Customer story: Common Services Center

About Common Services Center Scheme

- Common Service Centers (CSC) scheme is an initiative of the Ministry of Electronics and Information Technology(Meity), Government of India.
- CSC is a strategic cornerstone of the Digital India programme &CSCs are the access points for delivery of various electronic services to villages.
- CSC is managed and operated by local youth/person (VLE) their by providing opportunities for direct and indirect employment in rural India.

Unique features of CSC



Presence in every
Gram Panchayat



Citizen can avail the
Government and
Business services in an
assistive format



Required IT infrastructure
which makes CSCs one
stop solution



Availability of state and
district management
team



Centralized service
delivery platform/ Digital
Seva Portal (DSP)



Village Level
Entrepreneur (VLE)
belongs to the same
community/ village and
known face for everyone
in local area



Time & cost saving



Woman Empowerment:
18% of CSC centers are
run/operated by women
VLEs.



CSCs at a Glance

Particulars	Outreach
Total No. of GPs as per LG Directory	2,59,760
No. of unique GPs Covered with CSCs	2,54, 219
Total No. of active CSCs (Urban + Rural)	5,49,465
Total No. of active CSCs at GP Level (Rural)	4,36,535
No. of villages in the country	6,50,328
No. of villages covered with registered CSCs	5,30,389
No. of women VLEs	71,222



Common Services Center before and after

- Longer release cycle
- On-prem capacity limitations to scale and Infrastructure and database management overhead

- Faster Go 2 Market cloud enabled CSC to consume capacity on-demand and accelerate project Release cycles
- Achieved scalability, high availability, resiliency and continuous security

CSC journey with AWS Cloud

Started using Elastic Compute Cloud for National Digital Literacy Mission

Used Amazon Aurora Clustering with Autoscaling for High Availability and Resiliency and Security

Reduced End-customer latency with AWS CloudFront Caching and delivery

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Leveraged secured Simple Storage Services for Object Storage

Elastic Block Storage and Elastic File System

Leveraged CI/CD Pipeline to accelerate deployment cycles and increase deployment frequency

Used AWS Lambda functions for event-based workloads to optimized cost



CSC journey with AWS Cloud

CSC is a technology innovator and enabler for different ministries and departments



Enabling mass level training programs with AWS

- Route 53 cloud DNS Services gives us the world class comfort in our **Diginame Initiative**
- Power of cloud gives us the scalable solution to deliver training and certification with end to end monitoring in our **Pradhan Mantri Grameen Digital Shaksharta** (PMGDISHA). We crossed nearly 4.5 Cr certification.
- Today with our solution on cloud, we are able to manage thousands of **Tele Law** consultations on daily basis and crossed 14 Lakh advice enablement figure.

Enabling health programs with AWS

- AWS drives our fast implementation of “Covid vaccination awareness initiatives”
- We are able to make thousand of telemedicine calls for human and animal healthcare
- AI/ML tools powers us to get insights of the Cultural Survey Application

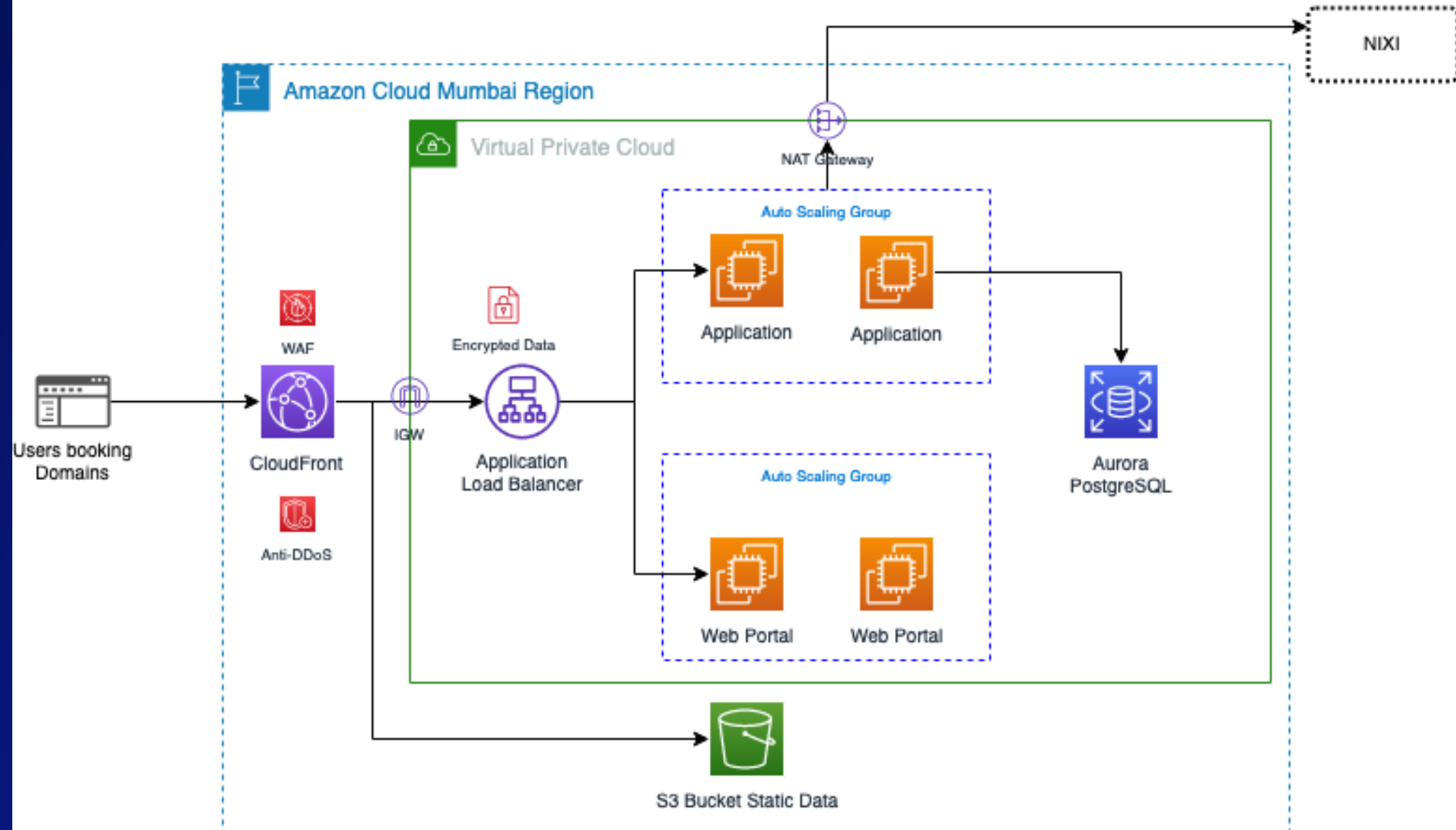
National cultural survey by CSC

- CSC helping to conduct cultural survey of 6 L+ villages
- Developed a mobile application to capture 9 parameters - beliefs, tradition, food, traditional dress, ornaments, heritage, festival and fair, traditional art & craft, famous personalities and prominent artist
- Helps uploads live videos, images, text etc.
- Next steps: use of AWS AI/ML service such as Amazon Rekognition and AWS Content Analysis

CSC Diginame

- With Diginame application, Common Services Center provides the domain registration, website design and builder tool and DNS management to the small enterprises and village level entrepreneurs of India.
- CSC Diginame is powered by AWS Route53 DNS service and website hosting is powered by AWS Elastic Compute Cloud.

Diginame Application Architecture



CSC-Give India-Vaccination Drive

Cloud Enabled Solution as web and mobile app is enabled for community mobilization and registration for Covid vaccination through CSCs and integration with Cowin platform

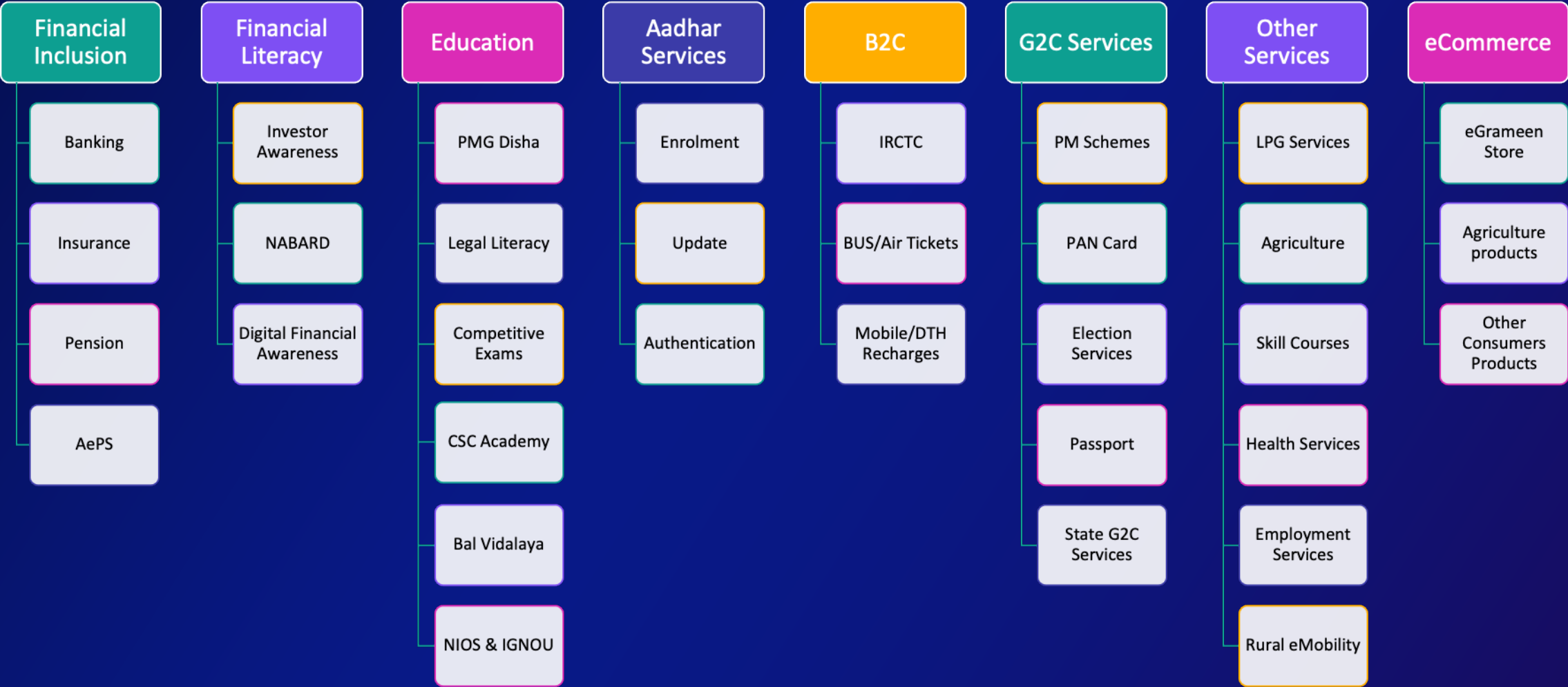
Give India : 0.25 Million

Vodafone: 1 Million

American India Foundation: 1.6 Million

CSC Academy : 2 Million

Scale of the CSC Services



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Your time is now

Build in-demand cloud skills *your way*

Thank you!



Please complete the session survey

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Limited

