



# Cloud *Securely scale services as demand grows.*

Through cloud technology, TCG modernizes government services for improved availability, scalability, and security. We have configured and deployed cloud environments for mission-critical applications on platforms such as AWS, Cloud.gov, and Microsoft Azure.

## WE OFFER

- ▶ **Native Cloud Development**
- ▶ **Migration to Secure Cloud Environments**
- ▶ **AWS Elastic Container Service (ECS)**
- ▶ **Platform as a Service**
- ▶ **Certified AWS Solutions Architects**

## TCG'S CLOUD APPROACH

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**Minimize Total Cost of Ownership**  
Evaluate current system architectures before beginning migrations to highlight and mitigate inefficiencies (this could mean deferring migration of a particular system until it can be redesigned).
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**Tailored, Iterative Migration**  
Implement hybrid systems that run partially in the cloud and partially in agency data centers. Secure, high-speed data connections can be maintained between cloud and on-prem systems, with components deployed to the cloud incrementally over time without major disruptions.
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**Application AND Supply Chain Security**  
Use FISMA controls for network topology, server configuration, application security, application logging, authentication, and monitoring. Align with NIST Cloud Reference Architecture to provide standard approaches for network and application controls. Target Major FedRAMP-certified cloud providers.

## PARTNERS



## TCG CLOUD SERVICES

### CONTAINER ORCHESTRATION

**Automatic scalability**  
AWS ECS, Kubernetes.

### CLOUD NATIVE DATABASE SERVICES

**Maintainability**  
Amazon RDS, MongoDB, Amazon DynamoDB, Azure SQL Database, Azure Cosmos DB, Amazon Redshift.

### LOAD BALANCING

**Performance, availability**  
Amazon ELB, Amazon Load Balancer, LoadMaster, NGINX, Zevenet, Incapsula.

### CONTENT DELIVERY NETWORK (CDN)

**Increased reliability, performance, cost savings**  
Akamai, Amazon CloudFront, Cloudflare, Azure CDN, Google Cloud CDN.

### VIRTUAL PRIVATE NETWORKING (VPN)

**Improved security, reduced risk**  
AWS VPN, Azure VPN Gateway.

### INFRASTRUCTURE-AS-CODE

**Supports CI/CD, provides consistency, visibility**  
AWS CloudFormation and Terraform, Ansible.

### SERVERLESS ARCHITECTURE

**Cost and time savings**  
AWS Lambda, AWS Fargate, Azure Serverless.

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## NIH NITRC

### SUCCESS STORY

The Neuroimaging Informatics Tools and Resources Clearinghouse (NITRC) has transformed neuroscience research through cloud technology, putting vast stores of data and computing power at the fingertips of researchers across the globe at a fraction of the previous cost. Research that previously took a year or more now takes weeks. Computing power that cost thousands now costs pennies.



Funded by the National Institutes of Health (NIH), TCG designed and developed NITRC as a collaborative site and repository of neuroimaging analysis software, publicly available datasets, and virtualized computational environments that can be run anywhere.

NITRC uses the Oracle Grid Engine to permit grid pipeline computing across cloud environments on open AWS and Azure virtual machine images.

## OUTCOMES



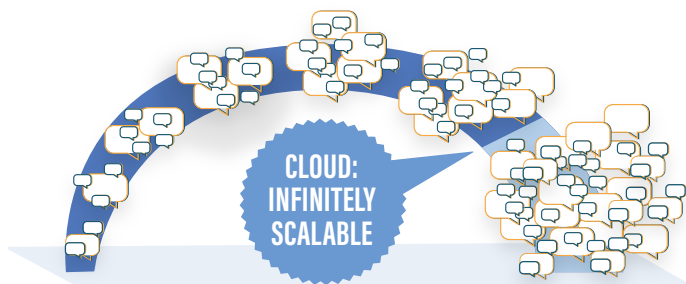
## FCC ECFS

### SUCCESS STORY

The Federal Communications Commission (FCC) Electronic Comment Filing System (ECFS) plays a vital role in ensuring the public has a voice in the rules and policies that shape vital telecommunication and broadcast issues, such as net neutrality. The previous version of ECFS crashed during periods of very high traffic, including when a late-night TV host urged viewers to comment in large numbers.



TCG worked with the FCC to implement a cloud-first, "infinitely-scalable," architecture, overhauling the system to meet future surges in demand and secure data. The core of the system uses AWS's Elastic Container Service (ECS) to dynamically manage, or "orchestrate," multiple containers. This architecture ensures reliability by reducing single points of failure. It also creates cost savings as expensive computing power is increased and throttled back as needed.



ECFS was put to the test in July of 2022. Dish Network proposed using the 12GHz radio spectrum for a 5G cellular network. SpaceX claimed that the plan would make Starlink "unusable" and urged Starlink users to sign a petition protesting Dish's initiative. A citizen signing the petition resulted in an automatic filing of a comment in ECFS. Within a week, ECFS had accumulated 70,000 comments originating from petition signatures, with the number eventually reaching 95,000. Yet, the increase in traffic barely registered for the ECFS team. Though the spike was noted, ECFS response time never wavered as the system scaled automatically to meet the demand.

