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Cognitive hybrid cloud operations: A platform-based approach for efficiency and resilience

Abstract:

Today's IT infrastructure is a complex ecosystem, encompassing interconnected systems that span on-premises data centers, multiple clouds, edge computing and containerization. Managing hybrid cloud operations across different private, public and edge platforms poses a challenge as well as an opportunity to build integrations and synergies to deliver seamless transition across platforms and deliver flawless operations with minimized downtime, all while retaining security compliance and best practices. In today's 24/7 economy, the demand for agility, efficiency and resilience is paramount.

Cognitive hybrid cloud operations addresses these challenges by leveraging the power of a platform-centric approach rooted in artificial intelligence and machine learning, accompanied by the guiding force of human intelligence. This approach redefines how the modern hybrid cloud is managed.

Introduction:

Gone are the days of reactive firefighting and manual work in infrastructure support. Traditional manual operations cannot effectively manage current complexity, leading to inefficiencies, increased security threats and hindered innovation. Cognitive hybrid cloud operations represent a paradigm shift, leveraging agentic AI powered by the Cognizant Neuro® AI and Neuro IT Operations platforms, which include tailored large language models (LLMs) and small language models (SLMs). This approach revolutionizes the management of hybrid cloud and data centers and provides data points that help to understand challenges with unprecedented precision and facilitates informed decision-making for a future IT roadmap.

Cognitive hybrid cloud operations: Deep dive

Building blocks for cognitive hybrid cloud operations

Cognizant Neuro IT Operations: A platform securely built on state-of-the-art technology to deliver an end-to-end, single pane view of observability, with AI and automation complimenting human expertise to improve resilience, reduce risk, conquer complexity and give full control and visibility over IT operations.

Cognizant Skygrade™: An integrated multicloud solution for cloud management, FinOps and migration so that enterprises can reach an optimized cloud-native technology estate. It also addresses the full digital transformation journey, including legacy application analysis, migration planning, refactoring, deployment and continuous optimization.

Cognizant Neuro AI platform: A gen AI-based interface; a hybrid human and AI capability for predictive operations with conversational interfaces for interacting with the AIOps Neuro IT Ops platform.

Predictive maintenance: Finding issues and incidents even before users become aware of them and taking proactive, automated remediation actions.

Integrating different technologies: Prebuilt templates with REST API integration between a comprehensive set of monitoring, observability and management tools.

Hyperautomation: Utilizes our prebuilt bot library and Terraform, Ansible and robotic process automation (RPA) playbooks.

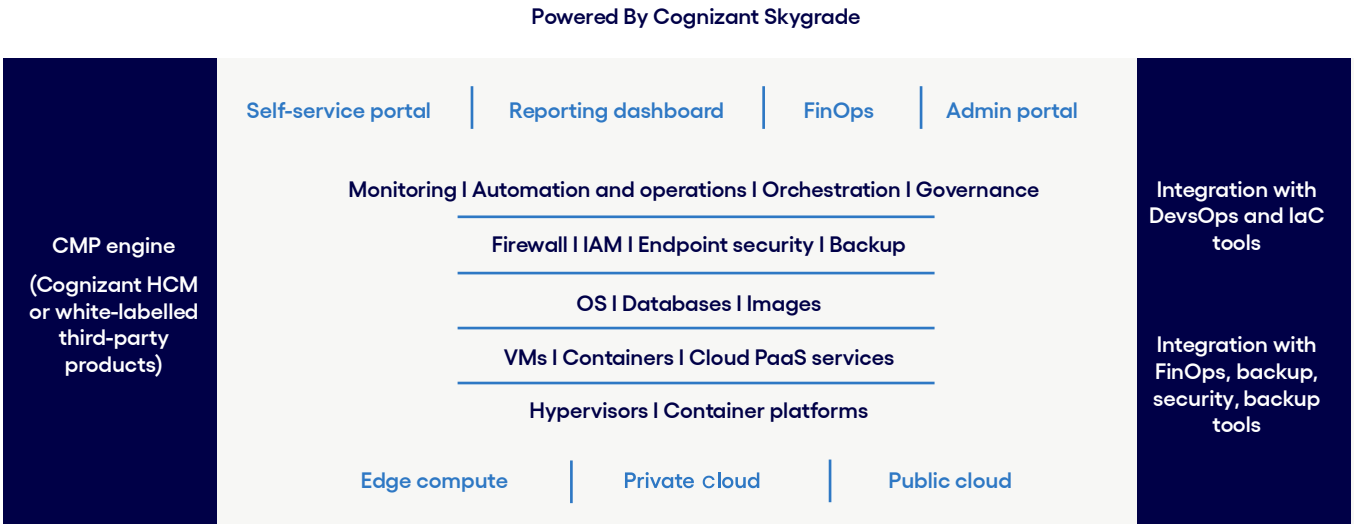
Service reliability engineering: A multiskilled engineering team that aims to solve complex operational challenges and unearth AI-based automation opportunities, thereby increasing reliability and availability of the applications hosted on hybrid cloud.

Risk management: Proactively identifying and mitigating risks to safeguard infrastructure and operations.

How does cognitive hybrid cloud operation work?

Cognitive hybrid cloud operations surpasses simple automation. It tightly integrates with different monitoring tools for infra, app and security, IT service management (ITSM) tools to extract contextual understanding of incidents thereby delivering an integrated observability across a complex hybrid cloud landscape. This intelligent correlation utilizes advanced AI and ML algorithms powered by industry standard LLMs and SLMs. Cognitive and end-to-end automated operations are delivered with Gen AI and Agentic AI interfaces through REST API integrations with tools such as ITSM, IT Operations management (ITOM), Robotic process automation / IT Process automation (RPA/ITPA) tools to enable intelligent data analysis and decision making.

Below is block diagram of the Cognizant hybrid cloud management platform (HCMP)



Some features and use cases performed using Cognizant hybrid cloud management portal (HCMP)

Platform features

- Single pane of glass for multi-cloud management
- Single sign-on to all modules
- Role-based access
- Approval mechanism (technical, business, security)
- Automated tagging
- DevOps/CI-CD/pipeline-enabled provisioning
- Golden blueprint management
- AI-driven advisory and remediatio complied to ITIL process

Cloud operate use cases

- User access provisioning
- Kill idle sessions
- Shutdown/restart VM
- Perform a system health check
- Update CMDB tags
- Open/dose ports
- Deactivate/inactive stale users
- Remove orphan Elastic IP
- Remove orphan storage volume
- Delete unused load balancers
- Delete unattached storage
- Identify untagged resources
- Identify inactive load balancers
- Add/modify/delete workloads
- Workload LCM*

Golden images (hyperscaler)

- Deploy a PAAS DB (MySQL)
- Deploy an IAAS DB
- Deploy a LAMP stack
- Deploy a Kubernetes cluster
- Deploy a load balancer with autoscaling group
- Design and deploy a two-tier application environment
- Post-provisioning users, roles, create DB, install I1S, patching, enable native and third-party monitoring
- Deploy in both on-premise and cloud
- Deploy container applications and other PaaS services

Cloud economic (FinOps) dashboards

- Monthly spend tracking
- Cloud billing forecast report
- Top five services by spend with breakups
- Cloud spend at organization level
- Cloud spend breakup by business unit
- Cloud spend breakup by project
- Cloud spend breakup by application
- Cloud spend on shared/core services
- Generate estimated cost for cloud budgeting
- Define, implement and track cloud
- Spend quotas
- Analyze current and historical data for cloud
- Container cost distribution and reporting
- Automatically track amortization**
- Automated actions for spend optimization
- Identify and alert on any spend anomalies
- Utilization of core components*

Data collected from different cloud providers (Amazon Web Services, Microsoft Azure and Google Cloud Platform) and private cloud (on-premises data centers and edge) is fed into trained LLMs and SLMs, then fed back to the Cognizant hybrid cloud management platform to perform different operations, provisioning and optimizations tasks as described below:

Predictive maintenance: Analyzing sensor data from network, servers, storage, cloud tenants/instances and devices to predict impending hardware failures. This allows for proactive maintenance and for minimizing unplanned downtime and costly repairs.

- Predictive maintenance utilizes time series analysis, anomaly detection and predictive modeling.

Capacity planning and optimization: Forecasting future resource needs based on historical usage patterns, application demands and business growth trends. This enables dynamic resource allocation, rightsizing infrastructure and maximizing utilization.

Workflow automation and orchestration: Automating routine tasks like provisioning virtual machines, deploying software updates and restoring systems from backups. This streamlines operations, reduces human error and frees up IT staff for more strategic initiatives.

- Implementing IT automation platforms, orchestration tools and RPA solutions powered by our prebuilt bot library enables seamless provisioning across infrastructure technologies

Self-service catalog build via front end: IaC provisioning on cloud can manage provisioning and de-provisioning across hybrid cloud environments seamlessly using forms with approvals in place. The backend utilizes IaC tools such as Terraform, Ansible and cloud-native IaC services.

Security threat detection and response: Detecting and responding to cyber threats in real time. AI/ML algorithms can analyze network traffic, identify suspicious activity (e.g., malware and intrusions) from intel received from security information and event management (SIEM) and automatically trigger security responses (e.g., blocking traffic and isolating infected systems) with an infrastructure using Cognizant predefined templates enabled by Ansible playbooks and bots.

Optimizing cloud spend: Leveraging AI and ML to optimize cloud resource allocation. The system identifies underutilized resources and recommends adjustments with details of usage patterns.

Using our Skygrade framework, Cognizant created a hybrid cloud management platform to enhance our cognitive hybrid cloud operations offering.

What cognitive hybrid cloud operations means to IT and business leadership

Cognitive hybrid cloud operations provides IT and business with several benefits.

Increased efficiency and accuracy: Automation of routine tasks and improved resource utilization lead up to 35%–40% gains in operational efficiency. It also improves accuracy

Enhanced reliability and availability: Proactive issue resolution and predictive maintenance minimize downtime and improve key metrics such as mean time to resolve (MTTR) up to 80%, ensuring improved business continuity

Reduced operational costs: Optimized resource allocation and reduced manual intervention with self-healing bots lead to significant cost savings

Faster time to market: By streamlining operations, cognitive systems enable faster deployment of new services and applications

Improved security posture: Real-time threat detection, intelligent analysis, enriched security logs from external feeds and automated response capabilities such as quarantining infected systems and updating security configurations enhance the overall security of the data center

Supports scalability: The platform ensures resilience as enterprises expand their IT landscapes or adopt hybrid/multicloud strategies

Prerequisites for cognitive hybrid cloud operations

The key components include:

a. Data Quality
Any AI/ML-based system is fueled by data, and the success of our cognitive operations is dependent on the quality of the data fed into the systems. Therefore, if the available data is not mature, our systems are designed to enrich data over time with human-machine collaboration to ensure cognitive hybrid cloud operations success.

b. AI/ML engineering expertise
Building and maintaining effective AI/ML models requires specialized skills and expertise. Our automation center of excellence (CoE) continuously works with iterative feedback from customers to improvise on use cases and tune LLMs and SLMs.

c. Data security
Our cognitive hybrid cloud operations framework is based on utilizing existing tools or introducing new tools within the customer environment without sending data outside the customer domain. This helps to ensure compliance with organizational information security policies.

d. Training
Implementing cognitive operations requires a cultural shift within the IT organization, emphasizing data-driven decision-making and a willingness to embrace new technologies and ways of working.

Collaborate to innovate

Cognizant has been collaborating with our partners and service lines to develop and contribute to robust LLMs/SLMs to deliver cognitive hybrid cloud operations. This includes creating use cases and doing proof of concepts (POCs) with our customers/partners from various industry verticals such as life sciences, financial, insurance, retail and manufacturing to accelerate their transformations and define new ways of managing their data center infrastructure.

Conclusion:

Cognitive hybrid cloud operations is no longer a futuristic concept. It is a reality transforming the way hybrid cloud/data centers are managed and operated. By embracing these technologies, organizations can achieve unprecedented levels of efficiency, resilience and agility in their hybrid cloud operations.

At Cognizant, we recognize the complexities of managing hybrid cloud operations. Our cognitive hybrid cloud operations offering simplifies these complexities. By using predefined integration templates and risk-free agentic/gen AI technology, we streamline deployment for our customers, enabling them to earn rich returns.

Click here to know more about Cognizant cloud, infrastructure and security services.

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