

## **Analysis of Network KPIs for Intelligent Migration to Edge Compute**

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The Department of Defense (DoD) has been engaged in a multi-year cloud first strategy and has been steadily migrating applications and services to public and private clouds. These cloud environments offer ubiquitous, inexpensive, and scalable compute, but with geo-political challenges and the need to support mission critical operations globally, a solution to intelligently move applications and data between regional clouds and to the tactical edge is required to ensure access applications and data at the point of need. Network quality and the capability to reach back to enterprise clouds degrades rapidly as forces deploy, and at a certain point it is necessary to move the application and data to the edge. Understanding that point requires real-time analysis of multiple data points including latency, jitter, packet loss, and uptime, and the ability to coordinate the movement of processing to the edge.

We will present a reference architecture and model for service providers and cloud consumers to adopt that enables migration of workloads between edge and enterprise cloud platforms. Real-time analysis of metrics and Key Performance Indicators (KPIs) must inform these advanced models for seamlessly making intelligent decisions.

We also discuss recommended follow-on research to consider other factors that weigh on an agency's decisions for edge processing including local power grid utilization, carbon footprint, geopolitical tensions, and cost. Furthermore, local challenges could necessitate the use of remote Enterprise cloud capabilities despite the lower network quality, including a power outage, technical glitch, or regional disaster. These complex scenarios and decisions necessitate incorporating Artificial Intelligence (AI) models and Digital Twin technologies to make decisions that optimize the underlying hybrid-, multi-, and edge-cloud infrastructure.