Market Insights Unveiled - NetForecast Overview

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NetForecast – Who We Are

• NetForecast has been independently measuring, assessing, and reporting internet customer quality of experience (QoE) for over 25 years

• Our founder was literally “in the room where it happened” in the early days of the Internet – the ARPANET

• We currently focus on three areas of Internet usage
  • Residential
  • Inflight Connectivity (IFC)
  • Airport Ground Cellular Services
We Measure the End-to-End Experience

In the Air

Data Center
- Server
- Router

Internet
- Transit Networking Peering Points

Geographic Zone Near Ground Station

Cellular Ground Station

Gateway
Wi-Fi Access Point

Users' Devices

FIRST MILE
MIDDLE MILE
LAST MILE
LAST METER

LANs
Router

Server

Wi-Fi Access Point

Gateway
Demanding IFC Environment

IFC networks are subject to significant service interruptions that adversely affect the user experience.

60% of flights show service interruptions and 7% of flights have such frequent failures that QoE cannot be calculated.

Low Upstream (aka Return) Bandwidth

Based on data collected from multiple IFC service providers, upstream bandwidth is usually so slow it adversely impacts some passenger activities.

Many flights experience average upstream speeds of .06mbps or slower.

Multiple Latency Sources

Geosynchronous orbits contribute to long latency.

IFC provider network routing and peering choices can increase latency by 10% to 15%.

Performance-enhancing proxies and traffic shaping can also increase latency.
Sample QoE Flight Map
Benefits of End-to-End Testing In the Air

- Enables airlines and service providers to identify weaknesses in the network – from cabin to last data center
- Supports airlines in making business decisions regarding the selection of new services / upgrades to current systems
- Provides a simple to communicate QoE score for analysis and comparison by airline management
  - Airlines with multiple services installed on aircraft can use QoE scores to compare services and identify areas for improvement
- Near-Real-Time information can inform airline employees of issues enabling proactive communications to inflight crew and customers
We Measure the End-to-End Experience

On the Ground

FIRST MILE

Data Center

- Server
- LANS
- Router

MIDDLE MILE

Internet

- Transit Networking Peering Points

LAST MILE

Cellular Network

Airline/Airport Personnel Devices

Connecting the dots from the Data Center through the Internet to the Cellular Network, we measure the end-to-end experience.
Sample Airport Cellular Coverage Maps
Benefits of End-to-End Testing At the Airport

- Improved cellular services enable airlines to improve ground operations
- QMap Airport app can be installed on multiple types of devices used at airport
  - Baggage Handlers
  - Tech Ops
  - Pilots
- Supports airlines and airports in making business decisions regarding the selection and oversight of cellular service providers at airports
- Provides a simple to communicate score for analysis and comparison by airline management
  - Airlines using multiple services to support ground operations can use data to compare services and identify areas for improvement