Nokia Deepfield Subscriber Intelligence

Deep insights about how internet content, services and applications are delivered and consumed

Nokia Deepfield Subscriber Intelligence extends the capabilities of Deepfield Cloud Intelligence to give service providers unprecedented visibility of internet services to the access layer, subscribers and end users.

Deepfield Subscriber Intelligence is a software application providing end-to-end IP network and service visibility that extends to the access layer, end systems, subscribers, and end-users. Subscriber Intelligence equips service providers (cable companies, multiple system operators [MSOs], and telecommunications and cloud service providers) with a multidimensional correlation of network-, service- and subscription-level data. The application delivers unique insights into how content and application flows—for internet over-the-top (OTT) content and on-net content and services—are delivered and consumed.

Subscriber Intelligence expands the network insight provided by Deepfield Cloud Intelligence to the access and subscriber layer. The expanded insight is made possible by augmenting Cloud Intelligence with information related to end systems and subscribers/end users.

New, subscriber-level data dimensions are obtained from RADIUS accounting and/or other data sources. These new data dimensions provide additional information about subscriber profiles, rate plans, access types and end systems such as digital subscriber line access multiplexers (DSLAMs) or cable modem termination systems (CMTS).

With these expanded data dimensions, it is possible to obtain detailed insights into how internet and on-net services are delivered and consumed at individual and aggregate subscriber levels. Sophisticated data anonymization options are included to assist with compliance with relevant privacy protection standards and regulations, such as the EU's General Data Protection Regulation (GDPR) and the California Consumer Protection Act (CCPA).

Deepfield Subscriber Intelligence is a component of the Nokia Deepfield portfolio of IP network intelligence, analytics and security applications.

Features

- Tailored data anonymization and privacy protection options
- Detailed insights into how internet services and applications are delivered and consumed
- Understanding of service consumption patterns—on individual or aggregate subscriber levels
- Measurement and benchmarking of subscriber quality of experience (QoE), e.g., for video streaming services

Benefits

- Improves network engineering and capacity planning
- Optimizes service planning
- It can be used to improve marketing use cases and offers with more accurate and granular profiling of subscriber's online preferences and behavior
- Facilitates operational agility for improved network performance and enhanced customer experience

- Helps deliver premium customer care
- Improve business engagements with third-party CDNs or service providers for improved competitiveness.

Why Deepfield Subscriber Intelligence?

Consumers of today's internet services embrace a growing range of cloud-based applications and content, including personal cloud storage, social media, online banking, subscription-based music and video streaming services, and online gaming. The cloud era has truly arrived, and content no longer has geographical or national boundaries. This creates challenges for service providers that need to deliver content to their end users and subscribers.

Providers have vast amounts of network-related data but little knowledge about how cloud-originating traffic flows traverse their networks, impact their infrastructure and are consumed by their customers. This knowledge has become critical because consumers demand reliable broadband connections and choose their service providers based on who can provide them with the best experience and price.

The only way for a service provider to understand how network performance issues affect subscriber QoE is to have detailed visibility into traffic flows that carry applications and services – all the way to subscribers. A provider interested in how its services are delivered and consumed needs a holistic visibility that extends from content delivery networks (CDNs) across peering and transit to end systems and users.

Deepfield Subscriber Intelligence provides deep network-, service- and subscriber-level insights that equip providers with detailed knowledge about how internet and on-net services are delivered to their subscribers and consumed by them.

How Deepfield Subscriber Intelligence works

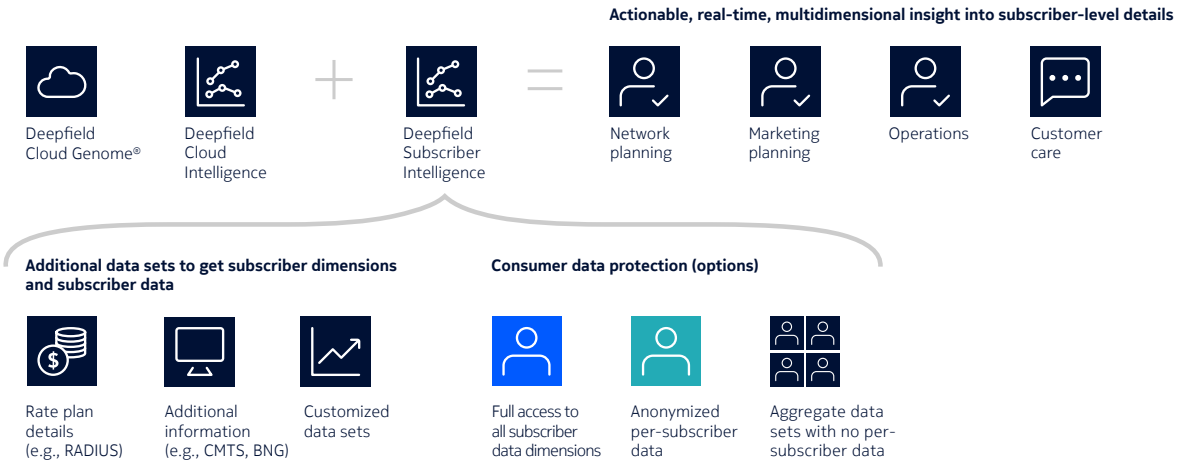
Deepfield Subscriber Intelligence builds on intelligence provided by Deepfield Cloud Intelligence and Deepfield Cloud Genome® and is enhanced with additional data sets that provide more details about systems and subscribers in the access layer (see Figure 1). Some examples of these enhanced data sets are:

- Rate plan details from RADIUS
- Additional data sets from CMTS and Broadband Network Gateways (BNGs), such as DHCP and REST APIs
- Customized data sets with information about set-top boxes (STBs) and customer premises equipment (CPE).

Sophisticated consumer data protection options are available to ensure privacy:

- Full access to all subscriber-related data dimensions with granularity detail at the individual subscriber level
- Anonymized per-subscriber data with subscriber identifiers hashed to 64-bit integers
- Aggregate data sets where no details are kept or made available at the per-subscriber level.

Figure 1. Overview of Deepfield Subscriber Intelligence



Many teams across your organization can leverage actionable, real-time, multidimensional insights into subscriber-level details:

- Network planning teams can benefit from the unique correlation between network configuration, service consumption and customer experience.
- Marketing teams can use insights to make their services more relevant to target audiences by better and more targeted profiling of online habits and behavior.
- Operational teams can improve their agility and automate their workflows.
- Customer care teams can provide customers with better and more proactive customer care.

Deploying Deepfield Subscriber Intelligence

Deepfield Subscriber Intelligence is a software application that network owners and operators can deploy in their network on-prem, on dedicated servers, or it can be deployed in the cloud using the software-as-a-service model. Seamless scalability is ensured in both deployment modes using sophisticated software architecture.

Using Deepfield Subscriber Intelligence

With unique multi-dimensional insights and correlation across many diverse data sets, now extending to the access layer and subscribers, Deepfield Subscriber Intelligence can provide answers to questions that are not easily or quickly answered.

Typically, human-friendly questions such as “How much of Netflix is consumed by my service plan A?” and “Show me the top 10 over-the-top (OTT) applications in service area XYZ” need to be translated into machine-friendly formats to be answered by big data analytical platforms. Subscriber Intelligence makes it easy and intuitive to make complex queries and obtain multidimensional insight and cross-correlation across diverse data dimensions, including:

- Access type, e.g., enterprise, residential or wholesale
- Individual (per-subscriber) and aggregate (per-subscriber classes or types) levels of detail
- Subscription plans
- Access node type (DSLAM, CMTS or optical line termination [OLT]) or CPE model
- Origin autonomous system number (ASN)
- BGP prefix

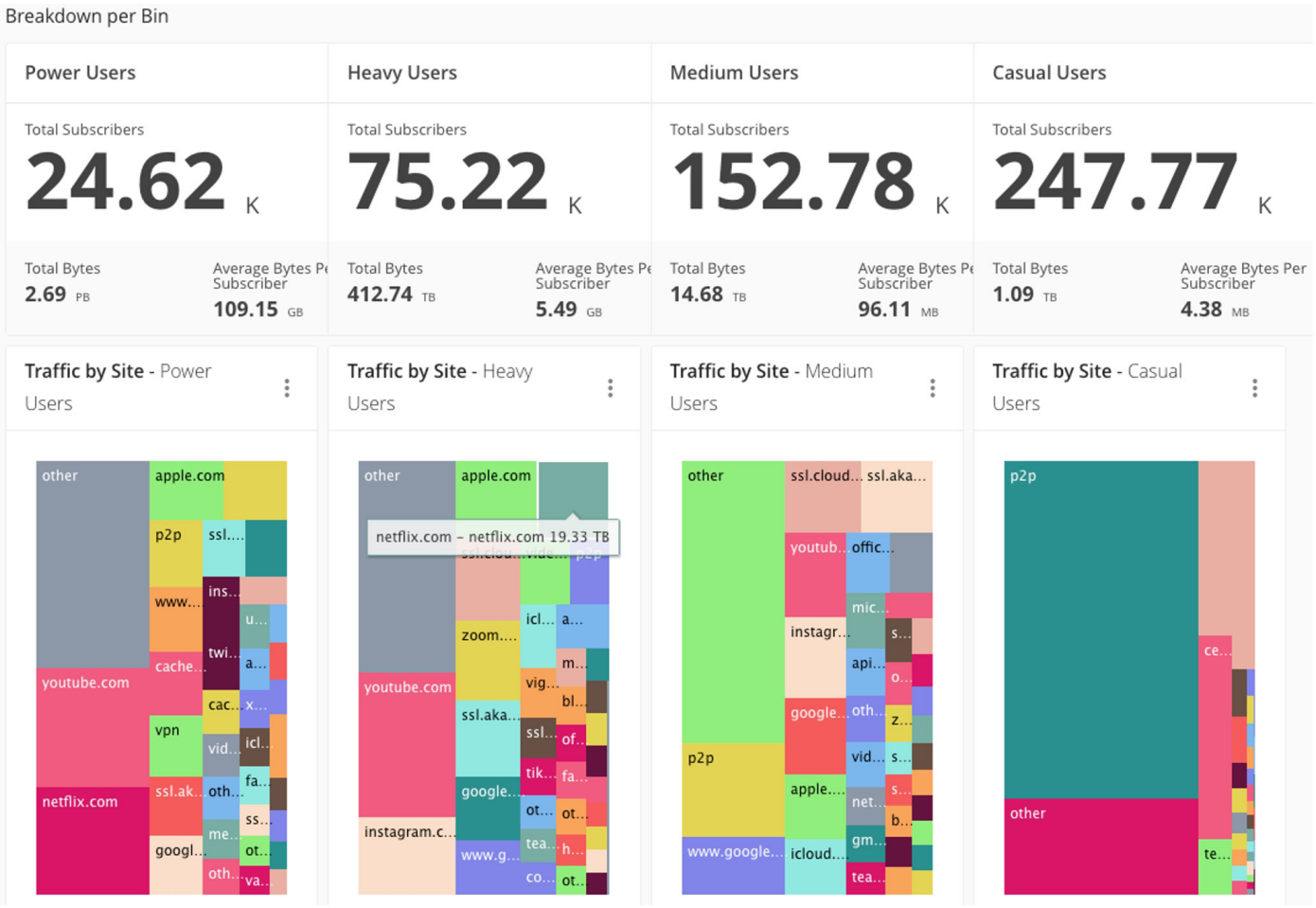
- Traffic category (type)
- Application
- BGP peer
- PoP
- Router
- Regions, metro areas and cities.

The unique insights obtained by Subscriber Intelligence can be viewed, reported, visualized, exported to other systems, and incorporated into workflows in many ways.

Subscriber Intelligence can perform automated, multidimensional queries across all application areas, from network planning and optimization, marketing and service planning, to customer care and operations.

The queries can be programmatically set, and their output can be passed to external, third-party systems, organizations and processes via REST APIs for further integration into data science systems or data lakes and additional workflow optimization and automation.

Figure 1. Example of visualization of distribution of monthly consumption - by traffic and content types - across categories of users



Leveraging Cloud Genome for better Subscriber Intelligence context

Deepfield Cloud Genome identifies the endpoints for all network traffic traversing the internet, providing visibility down to the CDN, application and service. This level of detail equips Deepfield Cloud Intelligence and Deepfield Subscriber Intelligence with the ability to identify and accurately classify all traffic across the entire IP network infrastructure, arming network operators with knowledge on how to make the best decisions about, for example, where to start rolling fiber-to-the home and upgrade the existing copper plant to fiber.

Cloud Genome empowers Subscriber Intelligence with holistic visibility into how services are delivered to the access layer with end-user and subscriber level of granularity—and also provides insights on service consumption patterns and customer experience.

Use cases

Deepfield Subscriber Intelligence can empower many different teams in your organization and enable them to reap technical and business benefits from a wide variety of use cases:

- QoE maximization for all users
  - Monitor and track top users by application, category or network area
  - Provide data for traffic management and policy enforcement to minimize the impact of top users on the network and other users.
- OTT and on-net traffic analytics with consumption insights
  - Gain OTT insights with breakdown by application, category or through trend monitoring
  - Create lists of Top 10 applications by category, e.g., OTT video, music streaming, gaming, etc.
  - Monitor trends for technical and business improvements, such as time to add capacity to the XYZ area or bring in the OTT XYZ content via caches.
- Customer care
  - Improve customer experience through better and proactive customer care
  - Develop detailed customer analytics and improve network and subscriber security
  - Optimize network analytics and resources for consistent, optimal user experiences across all regions of the network and all access types (mobile and fixed)
  - Seize the opportunity for service upselling of portals, security add-ons or better plans.
- Marketing
  - Optimize service planning; for example, create specialized service plans for gamers or heavy streamers
  - Improve marketing campaigns with better profiling of target audiences by adding customer-specific details that match subscribers' internet preferences or online behavior
  - Develop aggregate views of service plan consumption by applications, traffic categories, markets, etc.
  - Benchmark and optimize services for flexibility, cost-efficiency and profitability
  - Better understand the correlation between service plans and how services are consumed by categories of users and subscribers (e.g., classes of IoT devices for IoT service plans).
- Operations
  - Improve workflows
  - React in real time to diagnose service issues and respond to customer complaints
  - Automate common tasks and processes through real-time monitoring, alerts and notifications.

For details on use cases, visit the Deepfield Subscriber Intelligence web page.

The Nokia Deepfield advantage

Nokia Deepfield is a software suite of network analytics and DDoS security applications for large-scale IP networks. These applications optimize networks and services, enhance customer experience, improve network security and increase operational agility.

Deepfield applications are deployed globally in many networks, including fixed and mobile service providers, cable companies, cloud companies, and digital enterprises.

Deepfield's approach uses big data IP analytics, combining network data (telemetry, DNS, BGP etc.) with Nokia's patented Deepfield Genome technology (live feed that tracks internet content, applications and services and provides DDoS security context). As a result, the Deepfield applications offer multi-dimensional, real-time insights about IP-based services and applications running across the entire IP network - from content-originating domains and CDNs, across the peering and backbone to the customer edge.

The real-time cloud and network context provided by the Nokia Deepfield applications enables service providers to extract the actionable intelligence needed to design their networks better, react to performance anomalies and changing traffic patterns, manage security threats, and better package their product offerings to attract and retain subscribers.

The Nokia Deepfield portfolio enables service providers to understand, in real time, the service delivery path from the internet/cloud through the peering edge and at the customer edge—a path that can span multiple clouds, data centers, CDNs and networks.

This visibility is the critical first step to intelligent network automation to enable networks to respond immediately to changing conditions with minimal manual or physical intervention, lowering costs and improving performance.

To learn more about the Deepfield solution, visit the Deepfield web page.

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