Nokia Corteca

Smarter broadband for a better experience

White paper

Wi-Fi is a key part of daily life for people everywhere. But too many people struggle with Wi-Fi performance and coverage in their homes. These issues also have a major impact on communications service providers (CSPs) because they end up fielding high volumes of help desk calls, missing out on monetization opportunities and facing the constant risk of customer churn. CSPs need solutions that can help them ensure that customers get better Wi-Fi performance.

This white paper describes how the Nokia Corteca software suite helps CSPs improve customer experience by optimizing Wi-Fi performance from end-to-end: on the broadband device, through the home and into the cloud. Corteca also introduces value-added services that can help CSPs enable new revenue streams, and multivendor broadband device management capabilities that can lower their operational expenditure.

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Problem statement

Wi-Fi is everywhere. In 2024, 5.5 billion people were online. That represents 68 per cent of the world population[1]. More than 21 billion Wi-Fi devices will be actively used in 2024[2]. Gigabit services are becoming more common, and governments are working with CSPs to bring broadband to more people. Expectations around Wi-Fi have never been higher.

Unfortunately, many residential users struggle with the complexity of Wi-Fi and cannot get consistently good Wi-Fi performance and coverage throughout their homes. More than 40 percent of broadband households have experienced issues with Wi-Fi in the past year[3]. When Wi-Fi performance falls below expectations, they turn to their CSPs for help. For CSPs, poor or inconsistent Wi-Fi performance can drive up operational expenditure, reduce monetization opportunities and increase the risk of customer churn.

The good news is that there are opportunities for CSPs to provide a superior Wi-Fi experience, providing a greater chance to differentiate in a competitive broadband market, reduce operational expenditure and capture revenue with new service offers.

Broadband customers need and deserve better Wi-Fi performance. CSPs need to get more value from their broadband services. The challenge is to find a new approach that can fulfill both these needs. This white paper describes how the Nokia Corteca software suite can help CSPs seize these opportunities by delivering a smarter end-to-end home Wi-Fi experience.

Introducing Nokia Corteca

Nokia Corteca is a software suite that reimagines the Wi-Fi experience end-to-end by embedding Corteca intelligence at each stage, from the in-home router, through the home, and into the cloud. With Corteca, CSPs know they can deliver a Wi-Fi experience that generates new revenues, reduces operating costs, and increases customer loyalty. Corteca delivers **smarter broadband for a better experience**. A better experience, both for the CSP and the end-user.

Corteca value propositions

By bringing together the Corteca software components, we were able to define three value propositions:

- Corteca for Revenue
- Corteca for Experience
- Corteca for Operations

Corteca for Revenue

The first value proposition of Corteca is to enable CSPs to generate more revenues, above and beyond the basic broadband subscriptions. We achieve this goal by introducing new, value-add services, like cyber security, gaming optimization, working-from-home, etc. These services are in fact applications that are installed on the broadband device and create a win-win situation. Take the example of cyber security. By installing this application on the broadband device, the end users will be happy, since they don't have to install cyber security software on every device, like laptops, tablets, smartphones. But also devices that otherwise cannot be protected, like smart doorbells and other IoT devices, will also be protected.

1 ITU Facts and Figures 2024

2 Wi-Fi Alliance® celebrates 25 years of Wi-Fi® innovation and impact

3 Nokia survey and research

Also, the CSP will be happy, because for cyber security, you can easily charge 3-5€ in Western Europe, or 15 USD in the USA. A gamer is also more than willing to pay a monthly fee for a better gaming experience.

There is an alternative, and perhaps even more interesting strategy for CSPs, without having to charge a monthly fee. CSPs can bundle certain services, like cyber security with the higher tier broadband subscriptions, pushing more people to those higher tiers, which represent a higher ARPU by their own. And once end-users are at a higher tier, they will hardly ever want to go back to a lower one.

Corteca for Experience

With this value proposition, we want to bring a better end-user experience. The starting point is an easy-to-use mobile app for the end-user. Whether you want to install the first broadband device, or extend it with additional devices, the only real action required is to scan the QR code at the bottom of those broadband devices. Anybody can do that.

The next step is local Wi-Fi optimization: our broadband devices constantly scan the spectrum, detect potential issues and solve them, before the end-user even notices.

We then complement the local Wi-Fi optimization with an automated, cloud-based Wi-Fi optimization, where you benefit from visibility on the neighboring networks. This allows for a more granular optimization, for example adjusting the Wi-Fi transmit power, or performing a long-term Wi-Fi channel optimization.

In several commercial networks, where we have installed Corteca, we measured the following results:

- 29 percent points increase in Net Promotor Score.
- 69% increase in peak hour throughput (with the Corteca Cloud managing 3rd party devices).
- 9 out of 10 customers get an improved Wi-Fi experience.

Corteca for Operations

The objective of the third value proposition is to allow CSPs to reduce their operational expenses.

This starts with that automated, cloud-based Wi-Fi optimization that was mentioned before. Every 5 minutes, the Corteca cloud retrieves data from all the Wi-Fi points, analyzes the data and, if needed, finetunes the Wi-Fi parameters, on behalf of the end-user.

Network administrators can carry out advanced troubleshooting down to the device level, for proactive Wi-Fi management, and they get detailed KPI reporting across all the Wi-Fi access points in the entire broadband network.

Helpdesk agents get a real-time, holistic view of the in-home network. They can see the network topology, the devices connected and the traffic patterns, to quickly understand the situation and find a solution. They also get a 30-day history to check for past problems.

We measured the following results in commercially deployed networks:

- A 40% reduction of helpdesk calls for TR-369 managed devices, versus TR-069
- Lower call ratio compared to non-Nokia Wi-Fi CPE (0.9% vs. 2.5%).
- 50% shorter average call handing time (from 22 to 11 minutes).

The components of Corteca

Figure 1. The components of Corteca

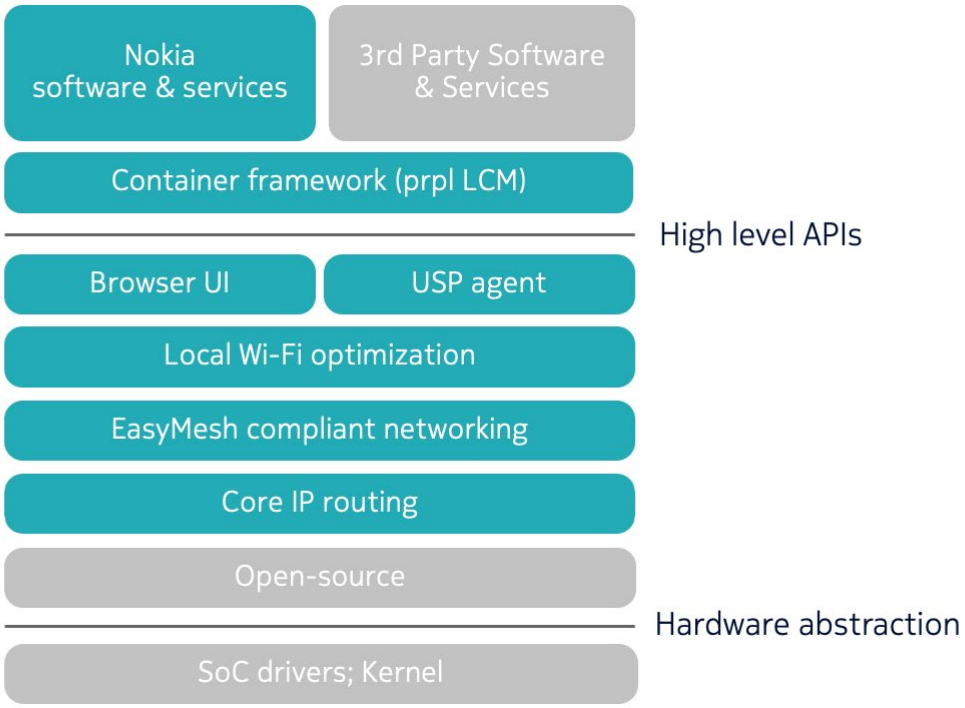
Corteca has three components:

- Corteca Device Software, leading to Corteca powered devices
- Corteca Applications, like cyber security and gaming optimization
- Corteca Cloud, from where the devices and the applications are managed

Corteca Device Software

A common Corteca software stack is embedded across Nokia Broadband Devices portfolio: from fiber gateways to fixed wireless access gateways and Beacons (our mesh extenders).

Figure 2. The Corteca Device Software stack



Corteca Device Software is based upon the OpenWRT open-source operating system, with hardened core IP routing functions (layer 3 functions) and many value-added features.

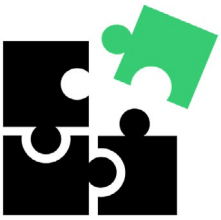
For the mesh networking, an EasyMesh standardized approach from the Wi-Fi Alliance is used alongside a local Wi-Fi optimization process which constantly scans the spectrum, detects and mitigates potential issues. This may include microwave ovens, Bluetooth devices, weather radars, etc.

At the management layer, with the browser user interface for end-users and the TR-369/USP agent for communication with the cloud platform.

At the very top, there is the application layer. The applications conform to the Open Container Initiative (OCI) for the container format and the run-time environment. Lifecycle management is performed by prpl LCM.

Corteca Applications

The Corteca Applications are all about creating new revenue opportunities, improving the user experience, and offering solutions that counter the users' concerns.



Corteca Applications transform broadband into a platform for growth

The Corteca Applications enrich the broadband experience with value-added services designed to grow ARPU, reduce churn and boost satisfaction. To help CSPs experience their impact, Nokia offers a Try & Buy program with a limited license pack (10 units), ideal for internal validation or demo setups.

A better connection means a stronger relationship

Every buffering moment or slowdown can damage the user experience. Nokia's QoE optimization technology makes broadband smarter by prioritizing critical traffic like work-from-home sessions or streaming. This enhances perceived value, increases NPS, and gives CSPs visibility to proactively improve service quality.

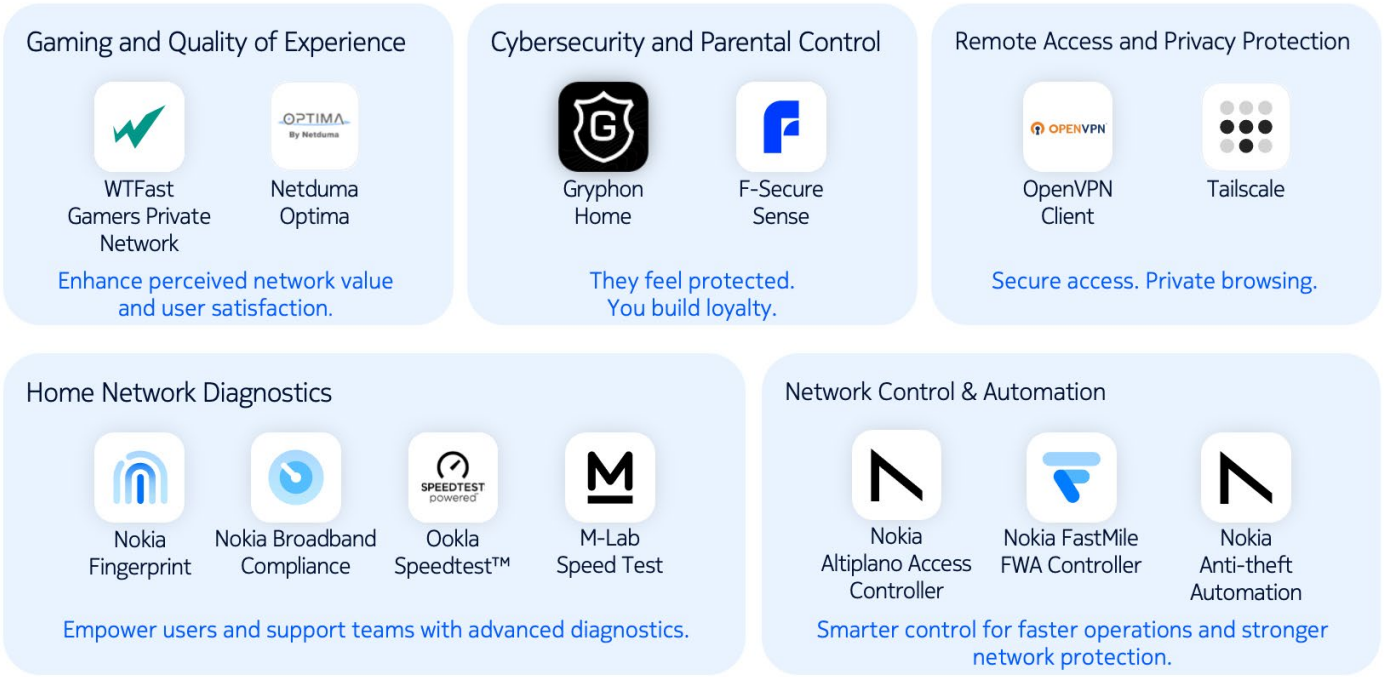
Parental concerns are rising, and CSPs can deliver peace of mind

Parents are demanding smarter ways to manage their kids' online experience. The Nokia parental control solutions give them easy, app-free tools to set boundaries directly from the broadband service, making CSP's broadband service more valuable, more engaging, and harder to leave.

Cyber threats are growing, and so is the opportunity

CSPs have a unique opportunity to offer built-in protection. The Nokia application adds value to broadband by securing every connected device, without users needing to install or configure anything. This strengthens customer loyalty while reducing the need for costly security support.

Figure 3. The Corteca Applications



The Corteca applications are a mix of Nokia developed applications, and applications that come from our developer partners. These applications include:

- WTFast Gamers Private Network (gaming optimization)
- Netduma Optima (gaming optimization and QoE)
- Gryphon Home (parental control)
- F-Secure Sense (cybersecurity)
- OpenVPN™ Client
- Tailscale VPN Client
- Nokia Fingerprint (diagnostics)
- Nokia Broadband Compliance (diagnostics)
- Ookla Speedtest™
- M-Lab Speed Test
- Nokia Altiplano Access Controller
- Nokia FastMile FWA Controller
- Nokia Anti-theft Automation

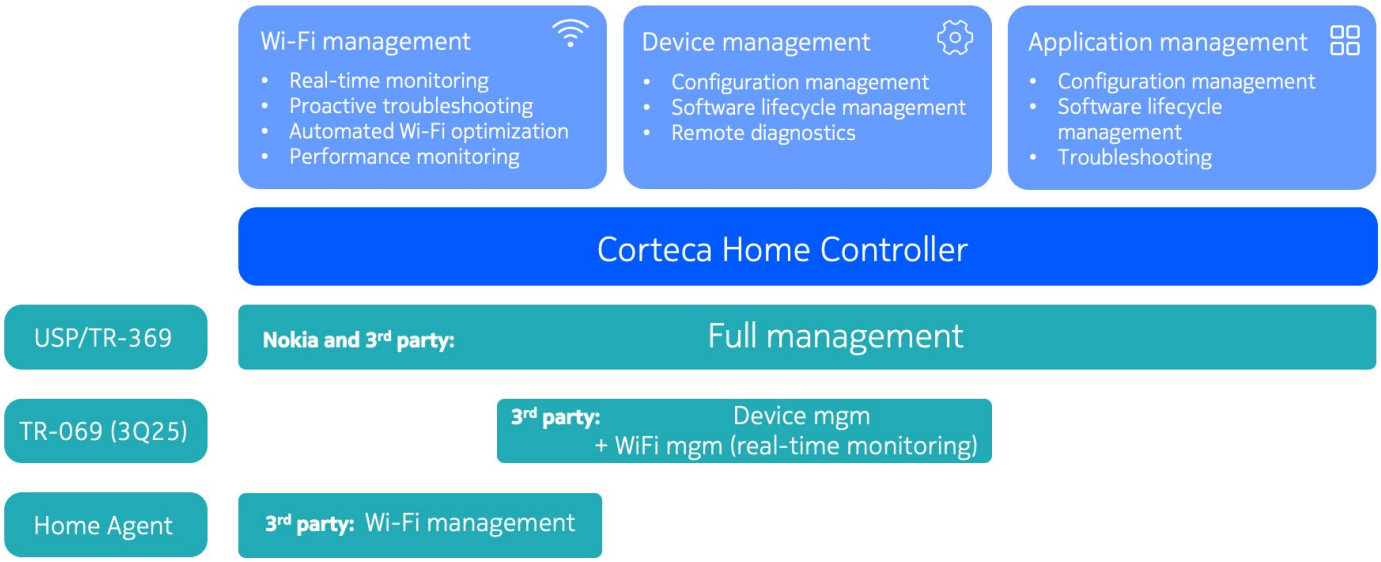
Applications can be installed on a per-home basis by the customer care agent, or in bulk by the network administrators, both using the Corteca Cloud.

Corteca Cloud

The Corteca Cloud gives CSPs complete control over their Wi-Fi offering. It includes the Corteca Home Controller that enables them to manage Wi-Fi services and broadband devices, along with the Corteca Console, a browser interface for CSP users, such as customer care agents and network administrators. With the Corteca Cloud, CSPs can offer a managed Wi-Fi service to their customers.

Corteca Home Controller

Figure 4. The functional modules of the Corteca Cloud



The Corteca Home Controller is the industry's first cloud platform with three distinct management services:

- Wi-Fi management
- Application management
- Device management

Wi-Fi management holds quite a few important functions:

- For the customer care agent, it provides a real-time holistic view on the in-home network
- For the network administrators it provides network-wide visibility and proactive troubleshooting
- Algorithms perform automated Wi-Fi optimization. Periodically, the Home Controller retrieves data from all the Wi-Fi points, analyzes the data and, and optimizes the use of Wi-Fi resources so that best connectivity experience can be delivered to the end-user.

Application management includes installing, uninstalling, activating, deactivating and updating the value-added applications.

Device management includes the functions you would normally obtain through an automated configuration server (ACS), like software life cycle management, configuration file management, alarms, remote diagnostics, etc.

There are three ways to communicate with broadband devices:

- The preferred way is through the Broadband Forum's TR-369, also known as the user services platform (USP)
- TR-069 allows communicating with legacy (third party) devices
- As a last resort, a small software agent, called the Home Agent, can be embedded in third party broadband devices

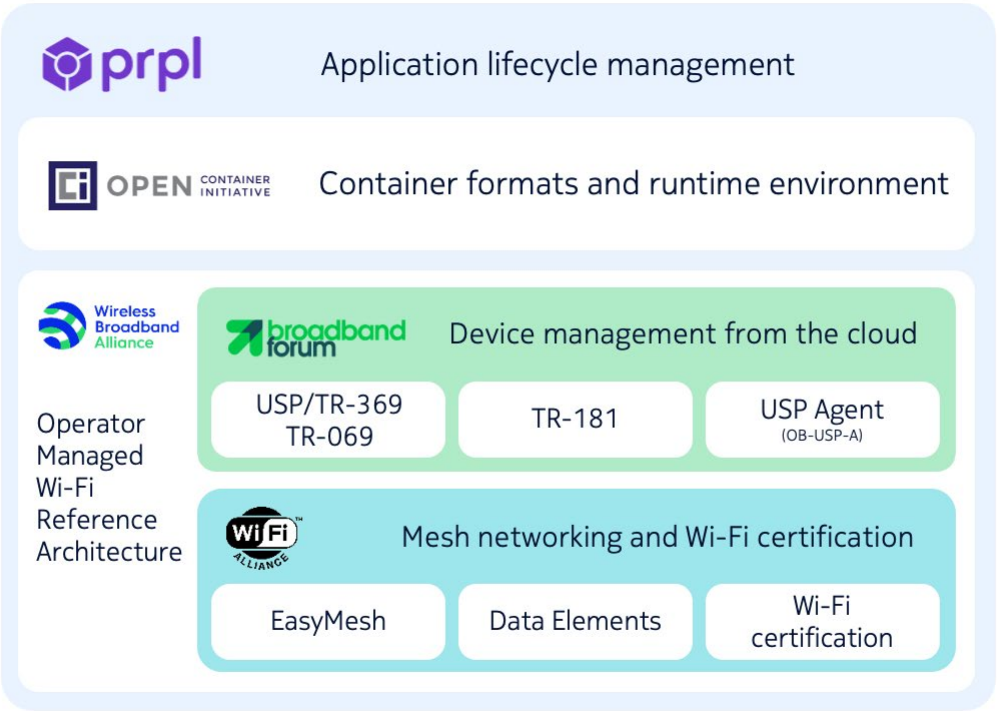
Corteca Console

The Corteca Console is the primary browser interface for the CSP and offers operating modes that meet the needs of different CSP roles. It offers a single-pane-of-glass view with dashboards designed for different user roles within the CSP organization, including:

- Customer care agents working with customers to solve Wi-Fi problems.
- Technicians deploying home networks, onboarding users and solving problems on-site.
- Network administrators monitoring network health and detecting performance issues.

Working with open standards

Figure 5. Creating an open, standardized environment for CSPs



At Nokia, we strive to create an open, standardized environment for CSPs. This approach provides the fullest flexibility to CSPs and avoids vendor lock-in.

Across the components of Corteca, various standards have been implemented:

- For Wi-Fi, the Wi-Fi Alliance's (WFA) standards and certifications apply
- For communication between cloud and broadband devices, the Broadband Forum's (BBF) standards apply
- By adhering to the WFA and the BBF, our products are also compliant with the Wireless Broadband Alliance's "Operator Managed Wi-Fi Reference Architecture"
- The application containers follow the format and run-time environment from the Open Container Initiative (OCI)
- The lifecycle management of the applications follows the prpl standard (prpl LCM)

Conclusion

Experience is everything when it comes to in-home broadband services. Great broadband services are too often undone by poor Wi-Fi experiences in the home. This can lead to more help desk calls and truck rolls, fewer monetization opportunities and higher churn rates. CSPs and their customers need solutions that make it easier to provide better and more consistent in-home Wi-Fi performance.

Nokia Corteca addresses this need with a software suite that works in devices, through the home and in the cloud to optimize Wi-Fi performance from end-to-end. It also introduces value-added services that can be installed on broadband devices to benefit the whole household.

As a result, Corteca enables CSPs to deliver a consistently superior Wi-Fi experience that generates new revenues, reduces operating costs, and increases customer loyalty.

Click here to learn more about how Nokia Corteca can help you deliver smarter broadband for a better experience.

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