Parallel Wireless,* Ice Wireless* Boost Arctic Wireless Service

Ice Wireless selects Intel-powered wireless technology from Parallel Wireless to deliver high-speed 3G and 4G/LTE mobile services to remote arctic Canadian communities.

Introduction

Despite the advances made in Internet access and telecommunications services, 4 billion people worldwide still remain unconnected.[1] One of the primary factors behind this lack of availability, typically in remote, rural and economically disadvantaged areas, is lack of network infrastructure. While the absence of networks can result from the lack of funding or government intention, for some rural communities in arctic Canada, the terrain and weather are the primary impediments to infrastructure development, and therefore, for the availability of mobile and Internet access.

Ice Wireless* deployed Parallel Wireless'* innovative technology, which leverages Intel® processors and system on chips (SoC), to cost-effectively provide radio access network (RAN) solutions delivering 3G and 4G/LTE services to previously underserved communities.

The Challenge

The arctic region of Canada is not only remote, for much of the year sunset is at 2:00 pm and temperatures reach -40° Fahrenheit. With only two months of the year warm enough and light enough for construction, the building of a reliable mobile telecommunications infrastructure has not been possible. Even in areas where the wireless towers exist, expensive and spotty satellite uplinks must be used in place of a fiber backhaul, resulting in low data throughput speeds and very high consumer costs.

Typical macrocell RAN infrastructure includes base station towers with remote radio units (RRU) mounted at the top to connect to the mobile devices and capture the RF signals. Those signals are then converted into packets by the baseband unit (BBU) servers, which are located in equipment cabinets located at the base of the tower. Servers in these cabinets need temperature control, which requires power for heating and cooling. Due to the extreme weather conditions in arctic Canada, ground-based equipment and servers won't work because there's no power for environmental systems. Even on sites with proper power, the short window for construction makes building these base stations extremely challenging.

The cost and difficulty of installing this equipment in these remote areas has limited wireless service competition, which means consumers have few cost-effective service plans and fewer high-value services, such as unlimited data or free roaming that are typically seen in more highly populated and accessible areas.

Ice Wireless is a mobile network operator (MNO) based in Northern Canada, serving Canada's arctic communities. It is providing consumers with a cost-effective reliable service; something that is lacking today. The challenges stated above were slowing Ice's network deployment. When Ice Wireless executives

learned of Parallel Wireless' mobile RAN solutions, they saw a competitive opportunity to build their mobile network infrastructure in a way that delivers mobile solutions that greatly improved service performance and affordability for customers in its hard-to-support service areas.

The Solution

The Parallel Wireless Converged Wireless System (CWS) was deployed by Ice Wireless. The CWS is high capacity, software-defined, multi-mode, multi-carrier RAN hardware that delivers 3G and 4G/LTE service simultaneously. The CWS also allows for Wi-Fi connectivity to any standards compliant Wi-Fi access point (AP) to enable carrier Wi-Fi.

In the CWS, Parallel Wireless incorporates Intel® Transcede™ chips. The Intel Transcede SoCs are specifically designed to satisfy emerging market demands for RAN hardware. Intel Transcede SoCs deliver a complete base station on a chip, using software-defined radio (SDR) to support concurrent multi-standard operation with carrier-class software. That means radio processing is done in the CWS, not in the data center, and not with ground-based host servers that would require unavailable environmental systems.

As a result of using Intel silicon, CWS delivers both the RRU and the BBU functionality in a compact form factor (under 31 lbs.) with a design that features a wind load making it

easy and cost-effective to install, as it can be attached to any street furniture, utility poles, buildings, or billboards. CWS has low power consumption, which means more of them can be installed in places where limited outdoor power is already in place. With less than one hour installation and configuration time, significant network infrastructure can be installed within the small adequate light and weather window of arctic Canada.

The CWS makes the most of the limited backhaul capabilities in rural environments through the use of wireless mesh to form mesh clusters with other CWS nodes. Thus, one backhaul connection can be shared wirelessly for miles via multiple hops.

HetNet Gateway Provides Orchestration

The other part of the Parallel Wireless solution is the HetNet Gateway (HNG), a network functions virtualization (NFV)/software defined networking (SDN) 3GPP-compliant RAN orchestrator. The HNG has virtualized all key gateway features for both cellular and Wi-Fi networks in a single virtual network function (VNF) to better orchestrate services including self-organizing networks (SON), security, eNodeB and others. The HNG runs on Intel® Xeon® processor-based servers, HNG orchestrates rural cells and makes them self-configuring, self-optimizing, and self-healing.
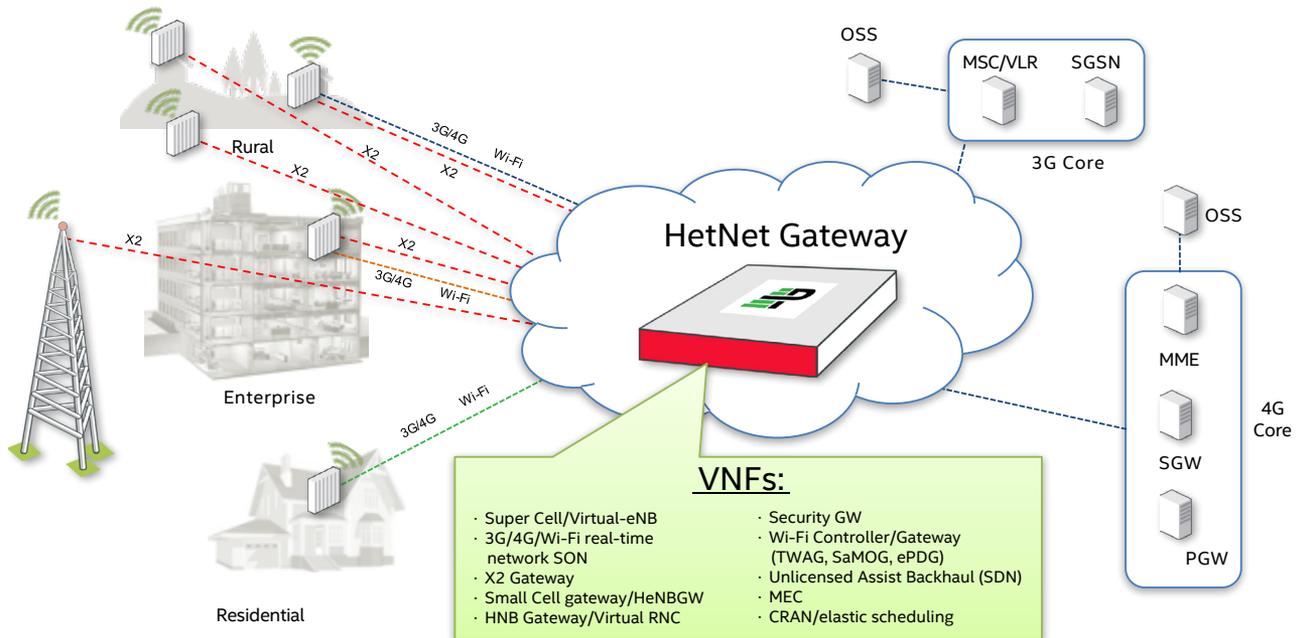
Figure 1. HetNet Gateway network diagram[2]

Ice Wireless' Solution

For Ice Wireless, installing Intel-based Parallel Wireless RAN solutions meant they could now provide competitively priced 3G and 4G/LTE services to their arctic Canadian consumers. For the first time in these markets, Ice Wireless was able to offer an unlimited data plan, with roaming, for only $89/month.

Meeting the challenges of rural wireless network deployment will help close the wireless coverage gap that affects billions

of people worldwide. As seen by the Ice network build out, the Parallel Wireless rural 3G/4G CWS and HNG products enable 3G/4G services by solving the power, backhaul, and cost issues that make rural network deployment a challenge.

About Parallel Wireless

Parallel Wireless is on a mission to connect the 4 billion unconnected people by reimagining the architecture of cellular infrastructure. The reimagined architecture enables operators to deploy any generation cellular networks as

easily and as cost-effectively as an enterprise deploying Wi-Fi—whether for rural, enterprise, public safety, M2M, Smart Cities, or dense urban applications. The company is in production on six continents and engaged with many leading operators worldwide. Parallel Wireless' innovation and excellence has been recognized with 33 industry awards. More information can be found at www.parallelwireless.com.

About Ice Wireless

Ice Wireless is a facilities-based mobile network operator that delivers 3G/4G/LTE-A technology to rural and remote communities in Northern Canada. Launched in 2005, Ice Wireless provides wireless solutions to Northern communities across the Yukon, Northwest Territories, Nunavut and Quebec. Ice Wireless customers may use their smartphones and devices across Canada, USA and internationally through the company's network of roaming partnerships. www.icewireless.com

About Intel® Network Builders

Intel Network Builders is an ecosystem of independent software vendors (ISVs), operating system vendors (OSVs), original equipment manufacturers (OEMs), telecom equipment manufacturers (TEMs), system integrators (SIs), enterprises, and service providers coming together to accelerate the adoption of network functions virtualization (NFV)-based and software-defined networking (SDN)-based solutions in telecom networks and in public, private, and hybrid clouds. The Intel Network Builders program connects service providers and enterprises with the infrastructure, software, and technology vendors that are driving new solutions to the market. Learn more at http://networkbuilders.intel.com.