

Small Cell Backhaul

Intelligent Backhaul Radio Delivers Freedom of Location for Small Cell RAN



Explosive growth of mobile data usage is driving the build-out of small cell RAN (LTE & WiFi) to meet demands for increased capacity and ubiquitous connectivity. When a fiber connection is not available to backhaul small cell traffic, and the radio environment does not accommodate existing LOS backhaul systems, a higher capacity NLOS mobile backhaul solution is required to deliver the density of coverage and bandwidth per square area necessary to provide a satisfactory user experience. The service requirements necessary to establish a footprint for large scale small cell build-out include a 5x leap in capacity with a 10x decrease in latency, as well as capability to support packet based timing, IP architecture and multiple traffic types.

Service Requirements for Small Cell Backhaul

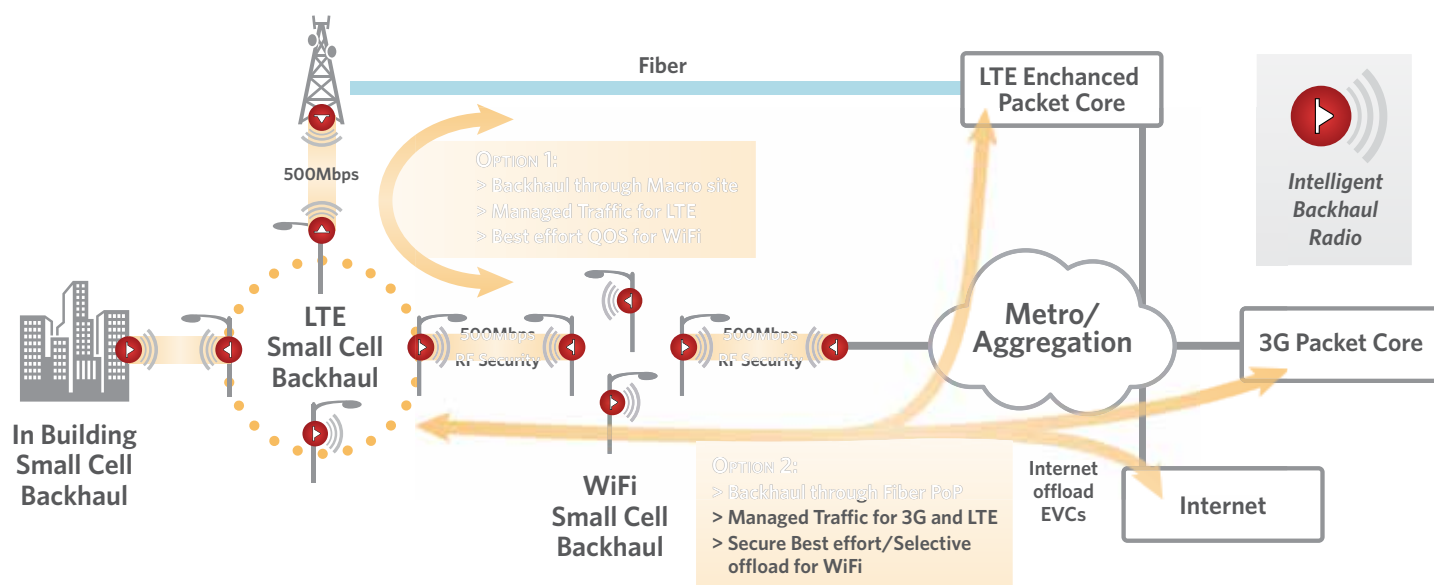
Capacity/Site	over 250 Mbps
Latency/Link	< 5ms
Sync	0.5-1.5micro seconds phase
Architecture	Flat All-IP distributed
Traffic	Unicast, Multicast, Broadcast

Fiber Equivalent Performance Anywhere

Mobile network operators seek freedom to place access nodes in any location required by customer demand, opportunities to monetize service, and spectrum efficiency without the constraints of access to fiber, or service compromises associated with copper. The flexibility to place service where needed, and extend the reach of existing infrastructure, defines the new market requirements for small cell backhaul to deliver fiber equivalent performance over wireless in NLOS, nLOS, and LOS conditions.

IBR Breakthrough Features

- Highest capacity in AnyLOS™: over 800 Mbps
- Lowest jitter and latency: <500µsec
- Carrier-Grade transport SLA's anywhere
- Extreme Interference Protocol (XIP™)



Small Cells for Capacity in Network Architecture for LTE & WiFi

A Radio, A Switch, and Much More: Integrated IBR Lowers Small Cell Network Equipment & Operating Cost

As a single integrated switch and radio device, the IBR performs the functions of up to 4 separate devices in a traditional LOS or NLOS radio, replacing the router, switch/NID, 1588v2/SyncE timing device, and SLA/OAM/PM devices, which lowers equipment costs. The IBR AnyLOS capability also enables operators to lower operating cost via access to traffic offload to multiple fiber points of presence forcing service providers to compete for the business of each site.

Secure and Flexible Architecture At Scale

For operators deploying small cell for coverage and capacity, the IBR supports any topology enabling architectural flexibility for both protected ring underlay and ring extensions to include in-buildings. Integrated CE/SLA, timing, UNI, and security, provide capability to support any architectures and traffic types at scale.

Highest Capacity with Lowest Latency Across Any Line of Sight (AnyLOS™)

The Fastback IBR fuses high performance data networking with advanced radio technology to achieve technical and economic breakthroughs that eliminate previous limitations of mobile backhaul performance. This new class of wireless device is an integrated carrier-grade switch and radio purpose built for the requirements of the new mobile network. The IBR is designed for high performance, low latency, and integrated CE/SLA capabilities to support new architecture and traffic types at scale.

Carrier Grade NLOS Solution

A key technical breakthrough in the IBR is Extreme Interference Protection (XIP™), Fastback's patented algorithms for mitigating effects of uncoordinated and self-interference to enable new applications of unlicensed spectrum including macrocell and small cell backhaul. The IBR interference mitigation capability enables sustained, carrier grade/SLA performance in unlicensed spectrum. This functionality unleashes new levels of certainty and reliability, along with the advantages of tapping hundreds of MHz of available 5 GHz spectrum to relieve the capacity constraints of licensed bands.

About Fastback Networks

Fastback Networks was founded with a vision to deliver innovative technology for the mobile infrastructure of the future, enabling network operators to deliver new services, tap new markets and monetize a new generation of mobile applications. With insights derived from the collective team's vast experience building leading edge radio and data networking solutions, Fastback Networks looked at the challenges of 4G/LTE deployment with fresh eyes and better ideas, and developed a transformational solution that enables the acceleration of next generation mobile services. Fastback Networks is funded by Foundation Capital, Granite Ventures and Matrix Partners.

Fastback Any Line of Sight

Sustained performance that automatically aligns and adapts to any radio line of sight conditions.

Line of Sight	Unobstructed link, similar to traditional point to point microwave at distances of a few kilometers, but without any precision alignment requirement
Near Line of Sight	Partial obstruction, working around obstacles such as trees and across rooftops
Non-Line of Sight	Complete obstruction, requiring radio waves to propagate around street corners and buildings

Extreme Interference Protection (XIP™)

- Adaptation of channel bandwidths (ms level)
- Frequency agility (ms level)
- Spatial agility (ms level)
- Re-transmission (sub ms level)
- Cancellation, dominant interferers
- Independent optimization, up and down links



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