HFR NETWORKS

FREQUENTLY ASKED QUESTIONS

How has HFR Networks achieved interoperability with 3rd party RAN vendors?

HFR Networks has been deployed as a transport solution with tier 1 service providers globally, interoperating with major RAN vendors. We are committed to open standards and during these deployments, HFR Networks continued to accumulate interoperability knowledge to enhance our solutions to integrate with 3rd party RAN vendors beyond the standards alone.

Which 3rd party RAN vendors has HFR Networks worked with?

For LTE deployments, HFR Networks has been integrated with all major RAN suppliers, including Ericsson, Nokia, Samsung, Huawei, and ZTE. With our history in South Korea, we were a leader in early 5G deployments and have since expanded globally interoperating with major RAN OEMs, including Samsung, Ericsson, Nokia, and Huawei to date. We also have experience with emerging suppliers such as Fujitsu, Mavenir and Parallel Wireless while remaining committed to open standards such as O-RAN.

How does HFR Networks address fiber exhaustion?

HFR Networks has many alternatives to address fiber exhaustion, including: 1) DWDM, and 2) packet-based aggregation. With DWDM (the flexiHaul HSN8000 Series) we combine as many as 80 optical channels or 40 circuits of bidirectional transmission onto one fiber. With our packet-based fronthaul gateway (the flexiHaul M6424), we can combine up to 24 radio units over a multiple 100Gbe NNIs depending on radio bandwidth requirements.

What is the difference between tunable versus self-tuning optical transceivers?

Tunable wavelength transceivers hold many advantages over fixed wavelength transceivers. Tunable optics greatly reduce inventory levels since as many as 80 part numbers are reduced down to one. In addition, they eliminate common time to market issues related to the tedious process of planning and procuring each and every fixed wavelength transceiver variant needed for each specific deployment. However, tunable optics do not provide plug-and-play "self-tuning" features. Tuning can be a time consuming process as it requires an on-site technician to integrate the optics into the control system of the equipment they are deployed on. With true plug-and-play capability, self-tuning optics offer automated bring-up as well as unique features such as remote inventory management and fiber/lambda performance data. By simply inserting a pair of self-tuning optics across a DWDM filter path, the optics will automatically scan the ITU grid, locate the correct optical wavelength of the filter ports connecting it, and self-tune to that specific wavelength at both ends. This self-tuning functionality saves valuable time during deployment since the person at the tower no longer needs to wait on manual provisioning or a specific part to fulfill the expansion request of the network. HFR Networks has done extensive work to integrate their flexiHaul Smart Tunable Optics into an xHaul environment, including providing the overall control software and logic to ensure interoperability across the complex RAN ecosystem. These optics are also controlled and visible in our network management system to ensure smooth operations.

Why is Time Sensitive Networking (TSN) important for 5G?

Time Sensitive Networking (TSN) is required when utilizing packed-based fronthaul transport within radio access networks. Standard packet switches are not designed to meet the strict clock distribution, latency, or jitter specifications required for a RAN solution to work. TSN 802.1CM standards define the precise requirements for ultra low latency (ULL) transport. Hence, 5G eCPRI circuits have more stringent specifications than legacy 3G/4G networks. 5G is driving the need for more cell sites, higher bandwidth and high performance applications. TSN switching for xHaul applications offers significant space and CAPEX savings that are critical for 5G economics. The ability to combine RAN applications while converging other packet services with preemption also simplifies operations and offers additional economic benefits.

Why is packet technology important to enable converged services (e.g. 3G, 4G, 5G, Ethernet, etc.)?

In many wireless access networks, 3G and 4G deployments have consumed all available fiber to remote sites. Deploying 5G greatly increases the bandwidth requirements while also increasing the fiber count consumption within a dark fiber deployment model. HFR Networks' solutions enable 5G deployments that mitigate fiber limits while satisfying the combined requirements of C-RAN and DRAN traffic to the same cell tower locations.

Why does fronthaul play a critical role in 5G transport?

To deliver on 5G capacity and performance promises, the fronthaul network must evolve to a flexible, standards-based scalable architecture. Within 5G, fronthaul plays a critical role in overall system performance by ensuring no additional latency is introduced and optimizing radio performance by prioritizing traffic in real time. Costs, scalability, operational simplicity, and network visibility are also critical. These are some of the many critical factors that must be considered when designing a fronthaul network for 5G.

How does HFR Networks simplify the deployment of small cells?

HFR Networks' Semi-Active solution for fronthaul transport deploys active elements on the central office/Hub end of the baseband unit/remote radio head (BBU-RRH) link. The remote radio end only requires a passive (non-powered) optical filter aggregating multiple DWDM self-tuning smart optics deployed directly to the RRH SFP+/28 port. This allows capacity expansion to a small cell site – without addition fiber consumption or equipment requirements in the remote site outside of the additional radio equipment. This saves valuable space and power to help enable economical and rapid site deployments.

How does HFR Networks' solutions enable an optimized neutral host environment?

The flexiHaul HSN8000 series and the packet-based M6424 solution are capable of handling large counts of remote radio heads (RRHs) at a tower site while transporting the traffic for each one in its own ITU wavelength. This achieves complete isolation for competing networks deployed on the same infrastructure at the same site.

ABOUT HFR NETWORKS:

HFR Networks, Inc. is leading the industry with our flexiHaul portfolio of intelligent xHaul RAN Transport and Edge Access solutions. We solve today's most critical RAN transport demands, especially when fiber is constrained for fronthaul or backhaul applications. Our solutions have optimized economics for this segment of the network, while also delivering high performance, simplified operations, interoperability across wireless technologies, and a diverse ecosystem of 3rd party RAN suppliers. HFR Networks' technological leadershipv helps customers to lower costs for 3G/4G operations, while also accelerating new 5G and Ethernet services. We enable advanced mobile networks by utilizing nanosecond timing to connect radios using CPRI and eCPRI, within both traditional and cloud-based mobile architectures.

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