MULTI-SERVICE CABLE NETWORKS

DELIVERING 100% QoS TRIPLE PLAY SOLUTION FOR MSOs
Redefining the Business Case for MSOs

Net Insight’s Nimbra™ platform features a 100% QoS core for video, voice and data with an extremely bandwidth-efficient resource management. This means a true single multi-service network delivering the same quality for video as today’s hybrid CATV networks. It combines efficient Ethernet functionality for IP TV, VoIP, VoD and VPN services with native video network interfaces such as ASI and SDI directly in the products. The result is the most efficient high-quality multi-service platform with the lowest CAPEX and OPEX.

ONE NETWORK, MANY SERVICES
The convergence of the communications industry with both MSOs and Telcos aiming at delivering triple play services to consumers, has made competition harsh. Combined with the technical conversion to digital and HDTV, the cable network has to be able to meet new critical requirements both on quality and economics.

MSOs now need to offer Internet access, IP telephony and VPN services to consumers and businesses. To meet this challenge, a true multi-service network is required. The hybrid networks being used today cannot deliver neither the QoS nor economics required to compete successfully.

SCALABILITY, QOS AND ECONOMICS – THE OTHER TRIPLE PLAY
To date, the technology choices available to MSOs have not been able to deliver both the necessary quality or cost structure. Typically, IP/MPLS offers higher capabilities for data but drives OPEX and decreases network utilization when there is much high-priority traffic, such as video and VoIP in the network. Next Generation SDH/SONET (NG-SDH/SONET) provides high reliability and QoS but is less flexible in bandwidth management and handling of data and VPN services. Platforms from both technologies suffer from the ability to scale to large multicast networks. Also, very few multi-service platforms can handle the migration from native video interfaces such as analogue and digital video, forcing a dual network design or a complete migration with expensive adapters at both the head-end and the regional hubs.

NET INSIGHT’S NIMBRA PLATFORM
The Nimbra portfolio overcomes these shortcomings and uniquely enables seamless media and triple play solutions with guaranteed 100% QoS over a single platform. It is based on NG-SDH/SONET, but offers a high quality Ethernet solution especially designed for effective and cost-efficient media transport:
- Zero-packet loss network
- Switching any traffic down to 0.5 Mbps ensuring highest utilization
- Multicast of all traffic types over any topology allowing centralized head-ends as well as effective regional insertion
- Both 1+1 protection and efficient mesh network restoration
- Optical control plane significantly lowering OPEX for provisioning
Net Insight's Nimbra Platform –
A video-centric multi-service platform based on NG-SDH/SONET

HIGH FLEXIBILITY WITH MAINTAINED RELIABILITY
Switching flexibility in the Nimbra platform is ground-breaking. All services, including Ethernet, can be switched with low-order granularity providing unmatched network efficiency. Additionally, the Nimbra products are not limited to an SDH/SONET hierarchical structure. Service providers can extract a single VC-11 or VC-12 and transport it separately over any network interface, without wasting a full VC-3 or VC-4. The same goes for Ethernet and video, e.g., ASI traffic. Service channels are established at a granularity of 0.5 Mbps up to the full link speed.

ANY TOPOLOGY, ANY MEDIA, ANY LINK SPEED
The Nimbra platform runs over DS3/E3 copper links all the way up to OC-192/STM-64 optical links with built-in CWDM/DWDM lasers. At the same time it provides a large variety of interfaces, including SDI and ASI for TV and video traffic. It therefore offers a seamless solution for delivering TV, video, VoIP and data from head-end to the regional hubs, interfacing directly with the CMTS and the QAM modulators without costly adapter equipment.

It is not restricted to any topology but can be set up in rings, mesh or point-to-point, any link running at a different speed. This enables the cable operator to run on a combination of dark fibers and leased capacity, whatever is most cost-efficient in that part of the network.

LOWEST COST-PER-BIT SWITCHING
High performance capacity combined with full VC-11/VC12 switching gives outstanding flexibility and utilization to a market-leading price. The Nimbra family provides savings of up to 80%, as compared to legacy equipment.

Operating expenditure is the main cost component for the operators. Net Insight has been a pioneer in using an automated optical control plane, which according to analysts can drive down operating cost with more than 60%. These savings make the Nimbra platform the clear choice for multi-service networks designed to handle triple play solutions.

UNIQUE MULTICAST SUPPORT
The Nimbra platform supports multicast and video services of any type and in all topologies. It is always with full QoS and without affecting other connections. Nodes can easily to be added or withdrawn from a multicast tree without affecting the traffic to other nodes. Restoration of a multicast channel only affects the leaf of the multicast tree and is very fast compared to e.g., multicast restoration in IP/MPLS networks. The Ethernet multicast functionality can work together with IP multicast protocols, such as PIM, but can also be used stand-alone to scale the multicasting of IP traffic to very large networks. The Nimbra platform provides the same 100% QoS whether it be ASI or IP/Ethernet multicast traffic.

Reliable, easy-to-use operations
The Nimbra platform lends all of its plug-and-play features from the data networks. However, when packet data networks become extremely difficult to operate when video QoS and multicast need to be handled, the Nimbra platform offers a reliable and deterministic control plane always offering end-to-end QoS.

The network restoration solution can be tailored to the individual demands on service availability. The Net Insight solution supports any mix of 1+1 protection, predefined source routing, or hop-by-hop fast rerouting in any network topology.

Similarly, service provisioning is done using dynamic routing of the network or by specifying a source route, loose by only specifying one or two nodes the path should traverse, or strict defining all ports on the path. The choice is made per service channel, offering complete flexibility.
Originally built to handle demanding real-time video services, the Net Insight Nimbra platform is the perfect fit for triple play CATV networks. The Nimbra solution integrates best-effort Internet traffic, broadcast TV, Video-on-Demand (VoD), Voice-over-IP, and legacy TDM services in a single-platform, end-to-end solution.

In packet networks, operators are forced to decentralize content to reduce the number of packet hops. In a Net Insight network, the delay is short and the QoS is always guaranteed over any number of hops. This makes it possible to centralize the TV head-end and content servers. However, the flexible network architecture allows for regional insertion or local VoD servers anywhere in the network. It thus becomes a commercial decision what is most suitable (more equipment vs. more link capacity) instead of a technical decision.

The network is often divided into a core network and regional networks connecting the CATV hubs. Services are separated on different channels. E.g., different services can have different VLANs which are mapped onto different channels. TV and video channels are provisioned end-to-end between the local hubs and the corresponding head-end. Data traffic can either be aggregated in a regional router, which in turn are connected to the other regional routers over NG-SDH/SONET channels or directly on wavelengths, or the data traffic is sent directly to the centralized router in the head-end.

For an operator planning to offer data services to SOHO customers, it can make sense to, in the core, combining a NG-SDH/SONET network for real-time traffic, such as TV, video and voice and IP/MPLS for VPN data and Internet traffic. The regional networks are deployed using Net Insight’s NG-SDH/SONET for aggregating the video, voice and data traffic to the core. This architecture off-loads the IP/MPLS routers from the major QoS issues and also for handling IP multicast routing in IP-TV implementations.

The Nimbra platform ranges from the Nimbra 340 2U high platform with built-in ASI and GbE interfaces to the Nimbra One multi-service platform, to the powerful 80Gbps Nimbra 680 running over OC-192 fiber or WDM networks.
All services on Net Insight’s platform are delivered on separate channels. This means that bursty Internet traffic will never interfere with bandwidth allocated for TV distribution or voice. Consequently, all services always get the bandwidth allocated and 100% quality of service is guaranteed even at full network utilization.

In a CATV network it is thus possible to run all services over the same network without compromising video quality.

Ethernet or ASI services can be provisioned with a channel granularity of 0.5 Mbps. A programme package of 10 TV channels à 5 Mbps would thus only use 50 Mbps across the network ensuring a high utilization. It is possible to provision a channel either as unicast or multicast from any port in the network to any other port in the network. Ethernet traffic from different sources can be aggregated to the same egress port, and it is possible to separate Ethernet traffic both based on port and VLAN. VoIP traffic can e.g. be put on another VLAN than the best-effort traffic and thereby separated over the network to ensure high quality.

Interactive VoD traffic to the same hub is typically run over a joint channel. The capacity of the channel can be allocated to match the exact requirement based on the number of subscribers and can also be changed over time. Games is becoming increasingly popular over the network. Games traffic can either be sent over the broadband data channel, preferably with a higher priority, or separated on its own channel for highest quality. All Ethernet ports on Net Insight’s Nimbra products support also packet prioritization based on 802.1p or IP Diff Serv.

Migration to digital and HDTV

Net Insight’s platform is a true multi-service platform that also includes video interfaces such as ASI, both SD and HD, and can take in analogue PAL and NTSC over SDI. The current trend is towards more digital and HDTV video feeds. Net Insight’s platform has very low overhead and can always run with full network load, making it possible to handle up to 100% more MPEG channels, whether ASI or IP/Ethernet, over the same link capacity. And not only over a point-to-point link but over a fully switched multi-service network.

Net Insight is today a leading supplier also in the professional media market where QoS and reliability is key. In deployments for large media companies, we are already today distributing HDTV content all across the US.
The Nimbra Product Platform

Net Insight's Nimbra product portfolio includes a complete range of video-centric NG-SDH/SONET equipment enabling a seamless network solution from the core backbone to the customer premises.

**NIMBRA 680** is a high-capacity carrier class switch for metro core and regional networks. The 160 Gbps 6 RU chassis can be equipped in various configurations including redundant 40 or 80 Gbps bi-directional switch planes. 8 slots are available for traffic boards including OC-3/STM-1 to OC-192/STM-64 SDH/SONET and high-density Gigabit Ethernet modules.

**NIMBRA ONE** is a multiservice access and edge switch with a wide selection of access and trunk interfaces. Switching capacity is up to 17.5 Gbps. 7 slots are available for traffic boards including OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, Fast and Gigabit Ethernet, DVB-ASI, SDI, E1, DS1, E3, and DS3. Optical interface options include CWDM and DWDM.

**NIMBRA 340** is a compact multiservice access device for efficient aggregation of data and video services. The 2 RU chassis has a switching capacity of 5 Gbps and comes with two built-in bidirectional DVB-ASI ports and one Gigabit Ethernet port. In addition two slots are available for plug-in modules with the same set of interfaces supported as for Nimbra One.

**NIMBRA VISION** is a comprehensive network management system for Nimbra networks. Full FCAPS functionality is supported over standard SNMP interfaces. Nimbra Vision continuously monitors the network for faults and performance degradation and displays status in a centralized network view. Integration of 3rd party equipment is easily achieved.

**KEY FEATURES**

- **Truly multi-service.** All-in-one platform with interfaces for TV, video, data, and telephony.
- **Low CAPEX and OPEX.** The high utilization in combination with the unique switching granularity offers very low CAPEX. The deterministic behavior of the network combined with the leading-edge optical control plane can lower OPEX with up to 2/3 compared to other solutions.
- **Unsurpassed switching granularity.** The Nimbra platform is the only one on the market with sub lower-order granularity for all connections.
- **End-to-end Provisioning and Restoration.** The integrated optical control plane enables services, both unicast and multicast, to be provisioned in a simple one step process. Services are automatically rerouted in case of failures.
- **Unique Multicast support.** The Nimbra platform supports multicast of any traffic types over any topology, always with full QoS and without affecting other connections. Nodes can easily be added or withdrawn from a multicast tree without affecting the traffic to other nodes.
- **Efficient Ethernet functionality.** The Nimbra platform combined efficient Ethernet functionality with QoS transport enabling a zero packet loss network. Channel granularity is Nx0.5 Mbps and features include 802.1Q VLAN separation, 802.1p user priorities, and Metro Ethernet Forum E-Line and E-LAN support.
- **Extensive management options.** The Nimbra platform can be managed by CLI, Web GUI, optional Nimbra Vision or 3rd party NMS through SNMP.
About Net Insight

Net Insight develops video, voice and data networking equipment that delivers guaranteed 100% QoS with maximum network utilization and multicast to provide a network that can efficiently and economically deliver advanced video services such as HDTV, Video on Demand and Digital Television combined with Internet and voice traffic. Our Nimbra™ platform enables our customers to launch new revenue generating TV and video related services for Broadcast TV, CATV, Telco triple play and DVB-T with significantly reduced CAPEX and OPEX. Net Insight is quoted on the Stockholm Stock Exchange’s O list and has offices in Sweden and the USA. For more information, visit www.netinsight.net