The Extricom Large Scale Solution

LS-3000 Technology Brief

Extricom's Channel Blanket™ has earned a reputation in the enterprise wireless LAN industry as the 'go-to' solution for organizations that want to realize the dream of true seamless mobility, together with wire-like reliability and high throughput, even in the most challenging environments.

The LS-3000 brings the Channel Blanket architecture to very large scale deployments such as logistics hubs, manufacturing plants, regional medical centers and different hospitality applications requiring high mobility.

Extricom

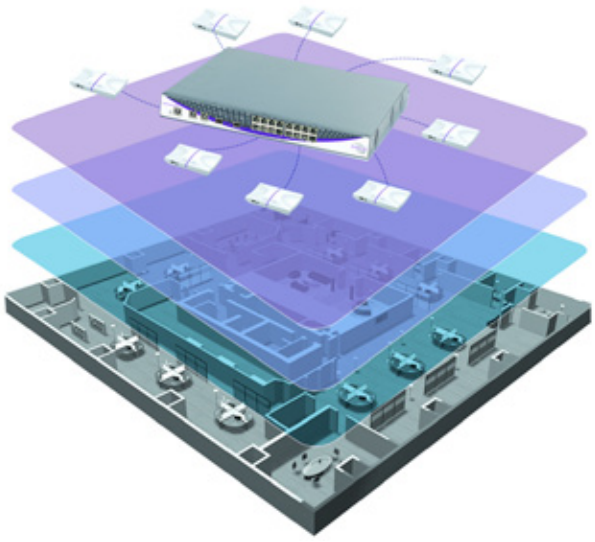
Issues with Microcell WLAN's

The basic IEEE 802.11 architecture comprises of access point directly connected to the network infrastructure (the distribution system) and mobile devices (stations) served by the access point. When where a single access point is incapable of serving the required space, a plurality of access points are deployed, sharing a common logical network ID (SSID). However, each mobile must be associated with one particular access point in order to be connected to the network. The mobile makes a selection between the access points and may decide to switch between access points e.g. while on the move.

Access points are assigned non-overlapping channels in order to mitigate interference, however in most typical deployments there are many access points in relative proximity (typically 10-100) and only a small amount of non-overlapping channels, typically 3-4, hence access points may interfere with each other. Furthermore, the mobiles have a difficult time choosing between access points: their radio senses only a fraction of the access points availble at any point in time (e.g. one third if three channels are available). Even worse, the handoff between access points is a fairly complex procedure especially if security considerations are taken into account. While handing off, no service is available to the mobile in either direction. Such connectivity disruptions impair latency sensitive applications such as voice over IP and real time remote control.

Extricom's Channel Blanket Architecture

A Channel blanket is created by assigning the same basic network ID (BSSID) and the same channel to all access points in the service area, which eliminates mobile device handoffs. Each access point comprises multiple radios, each assigned to a different channel, hence overlaying physically isolated blankets. The mobiles are served by one ubiquitous access system covering the service area with as many APs as required for coverage and speed. Different blankets can provide different types of service for different groups of mobiles. Capacity grows linearly with the number of blankets.



Channel Blanket Scalability

In order to provide a single BSSID, most access point functionality is centralized in the wireless switch. The wireless switch drives many ultra-thin access devices (radio points). Each wireless switch port drives a single radio point, delivers power to it and provides for bidirectional connectivity with the radio point. For greater scalability, an Extricom MS-1000 edge switch is placed in between the Extricom LS-3000 switch and radio points. Thereby, multiplying the number of access points by a factor of eight. Typically, a 128 AP network is supported with this two-tier switch topology. This tree topology also saves on cabling, as each LS-3000 switch to MS-1000 switch cable typically serves sixteen access points. The Extricom LS-3000 is used in verticals such as hospitality, healthcare and logistics, whenever seamless mobility and total wireless coverage is essential. This is specifically crucial for applications such as VoIP or AGV (Automated Guided Vehicles). AGV applications are used in very large logistics warehouses, where automated equipment moves around the floor and isles. The Extricom Channel Blanket architecture provides a large area of coverage, without the need to roam between access points.

Capacity

High system capacity is achieved by the use of both channel blanket architecture, which eliminates co-channel interference between access points, and the central role of the wireless switch, which controls all system transmissions. Network capacity typically grows linearly with the number of blankets used.

Resilience

The Extricom LS-3000 uplink port can be aggregated in order to address cable disconnection between the wireless network and the infrastructure. In addition, the LS-3000 software supports warm fail over between two LS-3000 fully overlayed deployments, in cases where any single point of failure is not acceptable. System 'B' operates in standby mode, so long as system 'A' is functional. Whenever system 'A' faults, system 'B' commences service on a different BSSID. Once system 'B' is functional, system 'A' assumes a warm backup role.

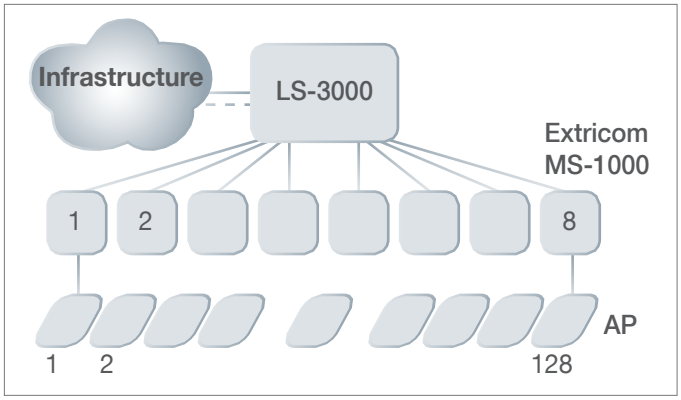
Channel Load Balancing

Load balancing between channel blankets may be desired primarily in order to increase total available bandwidth. Literally all mobile devices support the 2.4GHz band, but many do not support the 5GHz band. With the blanket architecture it is possible, within the confines of the 802.11 standard, to lure 5GHz-enabled devices to associate with a 5GHz BSS and leave the 2.4GHz band to mobiles incapable of using the 5GHz band. This feature is called band steering. A second balancing technique favors a blanket with a smaller number of users to a blanket with a larger

one. Mobile devices are never thrown off the network, the balancing act is based on assigning new mobiles to a less crowded channel blanket when they join the network. This technique is also applicable between blankets in the same band e.g. two blankets at 2.4GHz.

The Large Scale Switch

The Extricom LS-3000 switch typically drives up to eight edge switches and attaches to the network via one or two IEEE 802.3ad link aggregation ports. Mobiles are associated directly with the LS-3000 switch. Network configuration details such as security profile, SSIDs, assigned channels to blankets and VLAN assignments are maintained in the Extricom LS-3000.



The Extricom MS-1000 Edge Switch

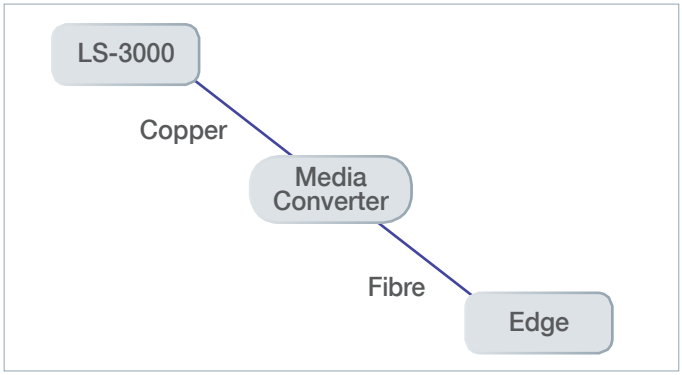
Powers up to sixteen access points and connects the APs to the Infrastructure through the Extricom LS-3000. Mobile devices are not managed by the edge switch.

The Access Point

Extricom access points have up to three radio modules, each operates on a different channel providing up to 450 Mbps. The access points are driven by one IEEE802.3z PHY and supports 802.3af Power over Ethernet. Power may be delivered by either the edge switch or the Extricom range extender on the copper port.

The Media Converter (Optional)

The media converter is a device used to convert between copper Ethernet and fibre Ethernet when required, for example, to extend the reach of the Extricom LS-3000 to an edge switch beyond the 100m limitation of IEEE 802.11.3z. The total length supported between the Extricom LS-3000 and the access point is about 400 meters. The total length of copper Ethernet is 100 meters.



The Extricom Network Management System (NMS)

The Extricom NMS is a management system designed to control single to multiple Extricom LS-3000 deployments from a single network entity. The NMS comprises a server and one or more client devices. The NMS is provided on-read only media with license scaling, according to the number of AP ports required.

Extricom's Firmware Software Upgrade

Switch software in both the Extricom LS-3000 and the edge switch are easily upgradable over TCP/IP to non-volatile memory. This mechanism enables providing new software features to the underlying hardware platform. The firmware requires a license to enable specific features to the installed network.

Compliance

The Extricom LS-3000 is 802.11a/b/g/n compliant. Any Wi-Fi certified device should be interoperable with an Extricom LS-3000 deployment.

Related Products

Extricom MS-1000 (edge switch hardware platform)
Extricom RP-30n
Extricom RP-40En
Extricom RP-22n
Extricom RP-32n
Extricom RP-33n
Extricom RP-22En
Extricom NMS (EXNM)

Extricom LS-3000
Wireless LAN Large Scale Switch Specifications

Please see EXOS datasheet for additional WLAN features.

Standards Compliance	
WLAN	IEEE 802.11a/b/g/n IEEE 802.11e/WMM
Ethernet	IEEE 802.3x, full/half duplex IEEE 802.3af Power over Ethernet
Security	
Encryption	802.11i hardware-based encryption for: WEP-64 and WEP-128 WPA-TKIP / AES (CCMP) WPA2-TKIP / AES (CCMP)
Interfaces	
Edge SwitchePort	Eight (8) Gigabit Ethernet ports
LAN Ports (Uplinked to wired LAN)	Two (2) Gigabit Ethernet RJ45/SFP Combo Ports
Physical Properties	
Installation Options	Rack mount (19" 1U) and desktop
Dimensions (W x H x D)	441 x 44 x 371mm (17.4 x 1.7 x 14.6")
Weight	3.6 kg (7.9 lbs)
LEDs	Power LAN Activity Activity to edge switch ports
Power	100-240V / 5A Max Built in IEEE 802.af injectors
Environmental	
Operational	Temperature: 0°C to 45°C (32°F to 113°F) Humidity: 0% to 90%, non-condensing
Storage	Temperature: - 20°C to +70°C (-4°F to 158°F) Humidity: 0% to 90%, non-condensing

Regulations Approval	
Safety	UL 60950-1 EN 60950-1
EMC	FCC Part 15 Class B EN 300386
Ordering Information	
	LS-3000 8-Port Extricom GbE Wireless LAN Switch Platform (Requires License and online Activation)
Related Products	
EXLC-LS-x	LS-3000 License for supporting 'x' MS-1000 fully populated edge switches ('x' can be either 4,5,6,7 or 8).
MS-1000	16-Port WLAN Switch Platform
Extricom RP-22n	2-Radio 2x2 MIMO UltraThin 802.11a/b/g/n Access Point
Extricom RP-32n	3-Radio 2x2 MIMO UltraThin 802.11a/b/g/n Access Point
Extricom RP-33n	3-Radio 3x3 MIMO UltraThin 802.11a/b/g/n Access Point
Extricom RP-22En	2-Radio 2x2 MIMO UltraThin 802.11a/b/g/n Access Point with Connectors for External Antennas
Extricom RP-30n	3-Radio UltraThin 802.11a/b/g/n Access Point
Extricom RP-40En	4-Radio UltraThin 802.11a/b/g/n Access Point with Connectors for External Antennas
Extricom RE-1000	PoE Range Extender
Extricom MC-1000	Media Converter
Extricom NMS	Wireless Network Management System

Note: Information is subject to change without prior notice.

About Extricom

Extricom is a manufacturer of 4th generation enterprise wireless LAN solutions, based on its Channel Blanket™ technology. Extricom solutions are used by customers in numerous industries worldwide, including education, healthcare, warehousing, and a rapidly growing number of large entertainment and public venues.

While adhering to the 802.11n standard, Extricom's patented topology provides wire-like reliability, high throughput, seamless mobility, unparalleled noise immunity, and is easy to install and maintain. In an era of intensive wireless usage powered by the market explosion of smart phones, iPads, iPods, tablets and other communication devices, voice, data, video, and location services are delivered with an always-on, robust and mobile Wi-Fi connection to any client, in any environment. Extricom Interference-Free™ WLAN is purpose-built to slash wireless complexity and future-proof your network for tomorrow's multi-service demands.

Extricom serves its growing global customer base through offices in the USA, Europe and Japan, and by working with a global network of distributors and partners.

For More Information Visit us at: www.extricom.com or contact us at: info@extricom.com