Digital Age Networking

Network Business Division

May 2019 Alp Doruk Çetinkaya

ALE Where Everything Connects

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Connectivity	ΙοΤ	Augmented Intelligence	Cloud Economics	
				DIGITALIII AGEIIOUU NETWORKING
Service Defined Network	loT digital business	Proactive Analytics	IT as Business Engine	
To easily and securely connect people and devices	To generate new outcome from millions of things	Using data analytics and AI to enable differentiated digital business processes	For IT to enable business productivity enhancement and revenue generation	

Enterprise

Connectivity	ΙοΤ	Augmented Intelligence	Cloud Economics	
				DIGITAL 1 AGE 1100 NETWOR
Service	loT digital	Proactive	IT as Rusiness	

Defined Network

To easily and securely connect people and devices

loT digital business

To generate new outcome from millions of things

Proactive Analytics

Using data analytics and AI to enable differentiated digital business processes

IT as Busines Engine

For IT to enable business productivity enhancement and revenue generation



Enterprise

Wireless

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A bit of history...





Bottlenecks and latency





Stellar next-gen Wi-Fi



- No bottleneck
- No latency
- Simplified architecture & licensing model
- simplicity of deployment & « unlimited » scalability



Enterprise

WiFi Express

Standalone mode, up to 64 APs

PVM Embedded Enterprise Express **CAPTIVE PORTAL** OV2500 Central Mangement & one common RF SVM (Secondary for guest access management **UPAM module:** environment Virtual Manager) + Captive Portal for advanced guests management **PVM** (Primary Self-organized and centrally one or + BYOD Virtual Manager) multiple managed mono-site APs **VLANs** Effortless sizing from a **NO CONTROLLER** OmniVista single AP to 64 APs (32 if one common RF 2500 AP1101 only) Easily manage and support Enterprise class ne common multiple sites and access one common RF functionality VLAN environment points from a single platform No license one or multiple Effortless growth to 4000 APs **VLANs** Can Evolve to Wi-• **Fi Enterprise** • One single license per AP, Member AP including all features **Evolutive design** Alcatel · Lucent grow your WiFi at your own **NO CONTROLLER** Enterprise pace

WiFi Enterprise

Managed mode, up to 4000 APs

KEY WIRELESS FEATURES

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Digital Age Networking Connects





Dedicated AP Scanning Mode







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Wireless Packet Capture

444 1	Service									
ъ	Neighbor AP									
8	RF Environment	-								
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	Sala Male United Digiter Cody -									
Utilization										
Scanning	Dels Sutis:	Q,								

Capture Config			×
Channel:	36	•	
TFTP Server:	192.168.100.2		
Filter : 🗹			
MAC1:	22:33:44:55:66:77		
MAC2:	Any Address	•	
Frame Type:	802.11 CTRL	¥	
	Reset Start		



SSID - Time Based Access Policy

Timer Diatog											MILAN CONFORM	
	arcener it										WLAW Configur	auon
	🛞 Absorpt Anothera										WI AN Name	q
	() tack time											
	General Time		174	-							117	F
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n							
Status	Security Level	Captive Portal	Operate	Create New WLAN			
Enable	Open	Disable	X X WMM	Hidden:	©Yes ®No		
Enable	Open	Disable	× ×	Multicast:	©Yes ®No		
			WMM	Broadcast ARP:	©yes ®No		
				Band:	2.4GHz 250	GHz	
				WLAN Access Timer:	(m (,		
				Access Days:	Mon 2 Tue	Wed 2 Thu 2	Fri 🖉 Sat 🖉 Sur
				Operational Hours:	(m 💽		
				Start Time:	00:00	Ħ	hr:min
				End Time:	23:59	Ĩ	hr:min
				MaxClients Per Rand:	Notes		(1-256)



Band Steering Enforcement Option (5GHz)

Profile Information Edit								
Wate	delsoit profile							Overside
Description	default profile							
Kountry/Reput	Ol-Onra							
Smart Load Balance								
Band Steering	(11)	Force SCH:						
Eachade MAC 013	1172.Da lyes spl	NAC (U) and clock Application	ιή.	+				
Association RSSI Threshold 🔒	245 0	*	55.48 0		SELme 0	1.0	50Hgr 0	1.0
Recenting RSSI Threshold (),	2.45 0	- *	55,88 0	1.6	SGLaw 0	1.0	SCHer 0	
Dynamic Lood Balaxie	080							
Background Scanning	(==0							
Scorning Interval	20	4.]	e					
Scarning Duration	50	05.						
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Performance Optimization	
Scanning Interval: 5s	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Scanning Duration: 110ms	zo 30 40 50 60 70 80 90 100 110
Band Steering:	on . 5G: 🗹 Exclude
Load Balance:	. off
RSSI Threshold:	2.4G: 0 5G: 0 Save
Roaming RSSI:	2.4G: 0 5G: 0 Save
Voice and Video Awareness:	. off
Airtime Fairness:	2.4G: . off 5G: . off



RTLS - Stanley/Aeroscout Integration

- Stanley group is a leader in the healthcare space delivering location services including proximity, asset tracking, heatmaps and geofencing
- Stanley's AeroScout solutions utilizes standard Fi (802.11) technologies as a communications infrastructure
- Stanley/Aeroscout certification completed





Wireless MESH



- Extend network with Wireless links
- Provide connectivity even when LAN cable cannot be extended
- Supported on all Stellar APs

SELF HEALING MESH NETWORK



ame	Speed(MB)	Model	LinkStatus	Enable	Operate	Edit Interface		
NET0	1000	Trunk	Up	Yes				
ackhaul1	0	Trunk	Down	No	1	Enable:	©Yes ®No	
onnector1	0	Trunk	Down	No	1	Model:	©Mesh [∰] Bridge	
						SSID:		
						B 4		
						Band:	©2.4G 9 5G	
						Is Root:	©Yes ♥No	
						Passphrase:		
						Confirm:		
						Continu		

Wireless MESH - Flexible Deployments

- MAX 16 APs in a MESH to one Root
- MAX 5 APs in any P2MP connection
- MAX 4 Hops



- The LAN/WAN connected AP is the Root
- All APs also broadcast client WLAN services (max 5)
- If there are two roots configured in the setup, the downlink APs will connect to the root with BEST RSSI
- IF Root fails the downlink APs will try to search for next best Root
- Recommend 5GHz MESH link



Customizable Captive Portal Page



Upload New Template



Frenderse

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Multi-Lingual Captive Portal

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Network and Communications. On Premises. Hybrid. Cloud.	English House Es	Please fill	━━ 中文 ━━ Deutsch
	■中文(中华人民共和国) ■ Germany	informati account fo	
Login to your account	+7	Guest Name	Nederlands
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Laptop / iPad

Smart Phone

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Wi-Fi Analytics Network Utilization / Client Distribution



Migrate Express Cluster AP to OV2500 / OVCirrus Managed

Migrate whole cluster to OV Cirrus

AP Configuration		Cloud Configuration			× .
Primary Name	IP				alled Information
AP-24:A0	192.168.20.37(AP) (M)	Contact to Cloud: Management Server:	activation, myovcloud,	com	1:A0 Edit. 3:56:12:24:A0
		Joining Pending		Serial Number; Model:	WK5163512345 OAW-AP1221
Neighboring Group				Firmware:	3.0.4.2048
AP-48:10	192,168,20.24	3.0.5.8		Upgrade Time:	Wed Oct 24 14:27:08 2018
AP-60:80	192,168,20.29	3.0.5.17		Upgrade Flag:	successfully
AP-08:D0	192.168.20.66	3.0.5.12		IP Mode: IP: Netmask: Default gateway: DNS: AP Mode:	DHCP Edit 192.168.20.37 255.255.254.0 192.168.21.254 219.141.136.10 Express Edit
Reboot All AP	Clear All Configuration	Beckup All Configuration	Restore All Configuration	Upgrade All Firmware	Connect To Cloud

User can migrate AP working in cluster mode to OV on-premise or OV Cirrus



OmniAccess® Stellar WLAN Secure & Simple Deployment

- Automatic intelligent radio optimization
 - Channel selection & Tx Power
- Coordination among neighboring APs
 - Client Context & Utilization
- Automatic LAN Access provisioning with OmniSwitch
- Simple management via AP Groups
 - Pre-register AP or auto-trust New AP connections





OmniAccess® Stellar WLAN Access Point Lineup

From low cost Wave 1 to high performance multi-gig Wave 2.



Enterprise

AP1201H In-room dedicated AP

One AP dedicated per room



Alcatel · Lucent 💋 Enterprise

WPA3 - New Wi-Fi Security Standard

- Mandatory PMF: providing protection for unicast and multicast robust management frames to include Action, Disassociate, and De-authenticate fram against eavesdropping.
- WPA3-SAE: providing users with stronger security protections such as:
 - Offline dictionary attack resistance
 - Key recovery resistance
 - Robust password use
- WPA3-Enterprise offers optional 192-bit security mode
- Intermediate transition mode: supporting WPA2-PSK and WPA3-SAE on the same BSS (mixed mode)

WPA3	AP1101	AP1201H	AP1201	AP1221	AP1222	AP1231	AP1232	AP1251	1ax APs
WPA3-Personal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WPA3-Enterprise	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CNSA (Suite-B)	No	Only 5GHz	Yes						



AWOS 3.0.R6

- WPA3-Personal
 - Mandatory PMF + SAE
- WPA3-Enterprise
 - Mandatory PMF
 - 192-bit crypto suite



WiFi Express 16→32→64→256 Cluster Sizing





- **3**rd Tier Hotels / Assisted Living Spaces
 - Low or No Touch IT
- Expand up to 256 APs in a Single Managed Cluster
 - Minimum of 8 QTY of AP122x or AP123x or AP1251 required to scale beyond 64 APs
 - Guest Portal Account Limit 2K
 - Connected Client Limit 2K



AWOS 3.0.R6

802.11ax OR Wi-Fi 6

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Digital Age Networking **Connects**



Meeting the new throughput standards



Enterprise



802.11ax : Wi-Fi Technology Evolution

22 YRs Airtime & Growing





OmniAccess[®] Stellar OAW-AP1320 Series

802.11ax Mid Range Indoor Access Points





OmniAccess[®] Stellar OAW-AP1360 Series

802.11ax Mid Range Outdoor Access Points





Switching portfolio

Roadmap and review

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The L2+ OmniSwitch Lineup

OmniSwitch 2220 OmniSwitch 6350 OmniSwitch 6450 OmniSwitch 6560 OmniSwitch 6465 Web-Managed Switch SMB Switch **Edge Switch** MultiGig Edge Switch Hardened Switch THEFTER PARAMA AAAA ----------STATATA ALLANAS GAAL GAAL ------ -----• 10, 24 and 48 port models • 10, 24 and 48 port models • 8, 24 and 48 port models • 24 and 48 port models • 6, 12 and 24 port models

- GigE access and up to 4 GigE SFP uplinks
- PoE/PoE+ support
- Web GUI
- Smart, yet affordable

- GigE access and up to 4 GigE SFP uplinks
- PoE/PoE+ support
- Zero-touch configuration

- GigE access, 10G uplinks
- PoE/PoE+
- Low-cost variants (L versions) restricting speeds; s/w upgradeable
- CodeGuardian

- 16 or 24 2.5G (802.3bz) ports
- PoE/PoE+/HPoE
- CodeGuardian

- -40C to 74C
- GigE/SFP (SFP+ in 24 port model)
- PoE/PoE+/HPoE



The L3 OmniSwitch Lineup

OmniSwitch 9900 SPB Chassis Core/Edge



- 11RU: 2 CMM slots, 5 NI slots
- 2.56Tbps full duplex fabric
- NIs: 48x10G, 48x1G, 8x100G, 16x 2.5G/5G/10G
- PoE/PoE+/HPoE, 10.8kW budget
- Redundant CMM, power, fabric
- SPB, Python, CodeGuardian

OmniSwitch 6900OmniSwitch 6860/6860eOmniSwitch 6865SPB Core/ToR SwitchSPB Edge SwitchSPB Hardened Switch



- Multiple variants, all interstackable
- 20/40/72 port 10G
- 32 port 40G
- Sub-microsecond port/port latency
- Lossless Ethernet, FCoE, VXLAN
- SPB, Python, CodeGuardian



- Multiple variants, all-interstackable
- 24 and 48 port models
- GigE access, 10G uplinks
- PoE/PoE+
- HPoE and DPI (OS6860e)
- MultiGig variant (OS6860-P24Z8)
- SPB, Python, CodeGuardian



- 16 port copper, 12 port optical, 24 port optical variants, all interstackable
- -40C to 74C
- GigE user/10G uplink
- PoE/PoE+/HPoE
- IEEE 1588
- SPB, Python, CodeGuardian



New webview face



Dashboards

Standardize page look and feelLanguage



OmniSwitch 6560 Gig and 10G Models Overview



SKU	10/100/1000 RJ45 Ports	Gigabit SFP+ (license uprade to 10G)	10GE SFP+	Power Supply	
OS6560-24X4	24	2	4	Internal	
OS6560-P24X4	24 PoE+	2	4	600W Modular	$\left[\right]$
OS6560-48X4	48	2	4	Internal	
OS6560-P48X4	48 PoE+	2	4	900W Modular	
					┝
SKU	Gigabit/2.5G	10GE SFP+	20G QSFP+	Power Supply	
OS6560-X10	0	8	2	Internal	
	The OS6560 G	igabit offers better confi	gurations OS6450	Alcatel·Luc	ent 🕖

Enterprise

OS6x65 : Rugged / Extended Temp Platforms Evolution Timeline Value L2+ **Advanced L3** Ext. Temp Metro Q1'18 Q2'19 Q4'16 OS6865-P16x --------11 OS6465T-12/P12 OS6465-P6/P12 Q2 '18 Q2'17 OS6865-U12x OS6465-P28 OS6865-U28x

* Direction



Connectivity	ΙοΤ	Augmented Intelligence	Cloud Economics	
				DIGITAL 111 AGE 1100 NETWORKING
Service Defined Network	loT digital business	Proactive Analytics	IT as Business Engine	
	To generate new outcome from millions of things			



IoT: the challenge on the Network

Millions of Devices

• Manage 1 by 1?

Reduced processing power

- Security flaws
- Hard to configure
- Risk for the whole network

Infusion Pump 2% 46% 51% Imaging System 19% 26% Patient Monitor 17% Point of Care Analyzer Medical Device Gateway Other Healthcare ECG Machine 3% Patient Tracking 6% Nurse Call System % of Security Issues Devices Deployed Medical Printer 0% 10% 20% 50% 0% 30% 60%

DEVICE DEPLOYMENT AND SECURITY ISSUES BY DEVICE TYPE





IoT Challenges







IoT Containment Automatic, Authenticated & Granular Segregation



Enterprise

Connectivity	ΙοΤ	Augmented Intelligence	Cloud Economics	
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Service Defined Network	loT digital business	Proactive Analytics	IT as Business Engine	
		Using data analytics and AI to enable differentiated digital business processes		



Augmented Intelligence

Automated business configuration

Available in 2019





Connectivity	ΙοΤ	Augmen Intellige





Service Defined Network

To easily and securely connect people and devices IoT digital business

To generate new outcome from millions of things

Proactive Analytics

Using data analytics and AI to enable differentiated digital business processes IT as Business Engine

Cloud

Economics

For IT to enable business productivity enhancement and revenue generation

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LBS - Market landscape



Indoor Location-Based Services & Asset tracking market size

- ABI Research forecasts that the worldwide indoor positioning market for next-generation asset tracking will reach US\$4.5 billion by 2022 with a CAGR of 32%
- As per ABI Research asset tracking solutions based on <u>Bluetooth Low Energy (BLE) and Ultra-</u> wideband (UWB) will rapidly replace expensive legacy systems such as passive/active Radio Frequency Identification (RFID).
- ABI Research forecasts that Bluetooth hardware infrastructure for asset tracking will reach US\$2.3 billion by 2022, which will represent 52% of the total infrastructure of asset tracking market.
- Smaller vendors will struggle to generate scale in the long term.

Enterprises are adopting asset tracking solutions for smart asset management



Asset Tracking - Vertical Applications



- Automate student and staff Identification in facilities and on campus
- Automate attendance, enforce policies and simplify reporting
- Track high-value mobile assets, maximize utilization and avoid loss and theft
- Track visitors and access wearing Wi-Fi badges, improve security

Industry and Transportation

- Making Asset Tracking part of safety plan, location of endangered workers via monitoring tool can be obtained.
- Custom alerts and notifications, audible or silent, plus adjustable zone configurations for Wi-Fi TAGs.
- "Man Down Alerting", where intelligent TAGs can identify, by accelerometers per example, if a fall occurred.



Asset Tracking - Vertical Applications (Cont.)



- Asset tracking allows hospitals, nursing homes and assisted living facilities, to know where their patients, staff and medical equipment are located always.

- Wander detection protects the elderly, infants are secured from being taken from a nursery without authorization and clinicians can be located, while on premise, 24/7, while alarms can notify staff of an event that may require immediate attention.

- Asset tracking also enables staff to locate medical equipment that requires regular maintenance for the safe use with patients.

Hospitality

- Asset tracking Wi-Fi-based, with two-way communications, to keep staff visible with an instant lifeline to help.

- TAG Bracelets, used in family or children's, that can give a localization service for the family, where each one is at each time, or even giving an alarm if some children pass a pre-defined zone.

- Hand hygiene compliance solutions can be find in hotels and restaurants.



Hand Hygiene compliance

- Report for Hand Hygiene while entering and exiting the room
- Combined report for the whole hospital staff
- Report by role (Nurse, Doctor,...), by zone/Ward based on Geo-Fences







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Compliance report generated from the hand hygiene event

Nurse exits the room activating the geo-fence

3





Nurse BLE badge when activated, sends hand hygiene event to LBS cloud



5



Nurse attends to

the patient

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Nurse washes hands and hand hygiene details are recorded in the LBS cloud

LBS solution components

Hardware + Mobile App Software Integration + Management

Beacons Infrastructure

Location SDK

BLE Beacon (battery embedded) BLE Dongle (Any AP with USB port) BLE Gateway

BLE Gateway (AP1201BG - Q4 2019)







Management



Stellar LBS Cloud Manager

- Beacons monitoring
- Define/manage geonotifications
- Analytics





OmniAccess*

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LBS offer

Enhance the user Multiple capabilities to Accuracy Measure **Boost revenues** Scalability meet your needs experience Analyze Reduce costs Ease of use Engage Optimize 🚯 Bluetooth' 4.0 BLE (Bluetooth Low Energy) Summer Compass **Measurements** 8 Geopositioning & Wayfinding Magnetometer (Optional) made by the Give location information to the Fusion smartphone Accelerometer user. Map data MEMS Gyroscope Trilateration (Optional) Barometer (Optional) **Analytics** Wi Fi Geofencing based. In real time/ LBS GPS Still under diferred time. Cloud development for 27,9 For smart **Stellar WLAN** indoor/outdoor Alcatel · Lucent 💋 50 transitions

Bag tarif during the

Geofencing Notifications (used for proximity marketing, objectoriented information, etc.)

Enterprise

Stellar Asset tags

Tags with inbuilt accelerometer to reduce the cost.

Various type of tags with different mounting options to support multiple deployment scenarios.



Round tags with different bands to be mounted on person or things

Card shaped tags which can be attached to employee badge

Tag with alert button to seek help.



BLE tag with Temp/Humidity sensor

Long battery life, typically 2 to 5+ years



AP Placement Recommendations:

• In normal business offices access points are distributed throughout interior spaces, providing service to the surrounding work areas, been selected traditionally based on coverage, WLAN bandwidth, channel, cell-to-cell overlap, security, etc....





AP Placement Recommendations:

• When we are using only data services and no roaming and AP redundancy coverage are required, we can work of 10% of cell overlapping:





AP Placement Recommendations:

• If we are using VoWLAN services, roaming and wants to give a fair coverage when AP fails and the others increase the cells, 20% may be required for cell overlapping:





AP Placement Recommendations:

- In a location-aware WLAN design, the requirements of Data and VoWLAN service applications, should be combined with the requirements for a good location service.
- It is important to ensure that access points are not only placed in the interior and the centre of floors, and must be included too, in perimeter.





AP Placement Recommendations:

- A device can be located with correct accuracy, if at least, the following are observed:
- Four access points are deployed on the floor
- One access point is found in each quadrant surrounding the device
- Three of the surrounding quadrants access points, are located within 20 meters of the device





Data Survey Result - examples:

	Power	Number of Access Points	Access Point Density (AP/m ²)
Data Survey	Primary Coverage: -74dBm	19 APs	122 m2
	Secondary Coverage: -80dBm	Fault Tolerant: 27 APs	Fault Tolerant: 97 m2
Voice Survey	Primary Coverage: -67dBm	22 APs	81 m2
	Secondary Coverage: -74dBm	Fault Tolerant: 35 APs	Fault Tolerant: 63 m2
Asset Tracking Survey	Primary Coverage: -67dBm	33 APs	67 m2
	Secondary Coverage: -74dBm	Fault Tolerant: 44 APs	Fault Tolerant: 50 m2



Network business services

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Investment flexibility

Cloud enabled options

Financial flexibility for IT investments

- ✓ Fixed monthly fee
- ✓ CAPEX \$\$\$
- ✓ OPEX \$
- ✓ Hybrid model \$\$
- \checkmark Tailored to business needs





Network-On-Demand - Choice of acquisition model

	Traditional CAPEX	Flex NoD OPEX
Expenditure 📰	CAPEX (Upfront)	OPEX (Monthly Fees)
Payment Base	Device	Device
Payments	Cash on delivery	Monthly pre-paid
Duration 😃	Lifetime	24-72 Months
Elasticity 🔊	Up	Up & Down
Service & Support 🗙	Sold Separate	Included
Network Management	Sold Separate	OVC Included (50 x BYOD + 50 x GA)



E-Demo and SpaceWalkers

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Remote demonstrations (eDemo)

- Remote demonstrations have been designed and deployed in ALE's Brest datacenter for a world wide availability
- A remote demonstration may be requested by a pre-sales engineer from ALE or a Business Partner through a web portal:





Remote Demos - catalogue





https://www.spacewalkers.com/

LEAVE NO STONE UNTURNED DURING YOUR COSMIC EXPEDITION



Welcome to the **Stellar Spacewalkers** Community

Put on your spacesuit for support dedicated to your Digital Transformation. The Stellar Spacewalkers Community is here to set new IT experience standards.











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