



## Cisco Mobility Express

October 2015

## Introducing Cisco Mobility Express



Embeds a virtual WLAN controller function into your access point



Uses 802.11ac Wave 2 technology: Fastest Wi-Fi available



Manages multiple Aironet Access Point models



Enables simple and fast IT: You're up and running in ten minutes



Supports Cisco's industry-leading WLAN features with no price premium

## On-Premises

NEW: Mobility Express



Simple deployment

## Cisco Mobility Express Solution



The Cisco 1850 Access Point provides virtual controller function that serves the other Access Points

## Mobility Express: Use Cases and Details



Sites with 500 clients or less where IT has limited span of control or reach



Autonomous Mode implementations looking to refresh 802.11abgn to 802.11ac wave 2



Companies or Sites looking to implement overlay / segmented Guest Access



Companies or organization that need to quickly setup temporary Wi-Fi for events

Key Features	Details
Clients	500
Access Points	25
RF Management	Yes
Advanced Security	Yes
Cisco Best Practices	Yes
Fast Secure Roaming	Yes
Rogue AP Detection	Yes
Application Visibility	Yes
Guest Network / Firewall	Yes
Device profiling	Yes
Mobile app	Yes
High Availability	Yes
Local Radius Server	Yes
Interoperability	PI 3.0.1 CMX 10.2 (CMX Presence) ISE 1.4 (802.1x authentication)

## Connecting 1800 AP for Mobility Express



Switch port is configured as trunk



Management traffic is untagged and is on native VLAN. Client Traffic is on trunked VLAN



Management interface on controller is UNTAGGED

(Cisco Controller) >show interface summary

Number of Interfaces..... 2

Interface Name	Port	Vlan Id	d IP	Address	Туре
management	1	untagge	ed 172	2.20.229.45	Static
virtual	N/A	N/A	192	2.0.2.1	Static

### Typical Mobility Express Deployment AIR-AP-1832 AIR-AP-2702 AIR-AP-1852 $\infty \infty \infty$ $\infty \infty \infty$ $\infty \infty \infty$ interface GigabitEthernet1/0/38 switchport trunk encapsulation dot1g switchport trunk native vlan 122 switchport trunk allowed vlan 10,20,122 switchport mode trunk SWITC H+ DHCP ISE PI СМХ TFTP

Presence

## AIR-AP18XX - Is it CAPWAP or Mobility Express?



AIR-AP-1852I-B-K9 – Ships with CAPWAP image



AIR-AP1852I-B-K9**C** – Ships with Mobility Express image which is built on top of CAPWAP



For Mobility Express, <sh version> on AP should display AP Image Type - MOBILITY EXPRESS IMAGE
 AP Configuration - MOBILITY EXPRESS CAPABLE

### Output of <sh version> on AP

AP Image version (active) : 8.1.10.159 AP Image version (backup) : 0.0.0.0

#### AP Running Image : 8.1.123.15 Primary Boot Image : 8.1.123.15 Backup Boot Image : 8.1.122.0 AP Image type : MOBILITY EXPRESS IMAGE AP Configuration : MOBILITY EXPRESS CAPABLE

## Mobility Express (Day0) – Boot Up process



## 'Cisco Wireless' App



8.1 MR3









### Over-the-Air WLAN Express Setup Connecting to CiscoAirProvision and starting setup wizard

Enter Password as



Connect to



Connected to CiscoAirProvision; IP Address assigned



Launch setup wizard at http://192.168.1.1 & create admin account

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		Set	tings				VVI-	FI	
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			Settings			K Wi-Fi	Cisco	AirProvision	
C	Notifi	Ð	Airplane Mode	σ		Forget Thi	s Network		
8	Contr	2	Wi-Fi Ciscol	AirProvisio	on				
C	Do Ne	*	Bluetooth	c	Dn	IP ADDRESS		BootP	Static
						IP Addres	s		192.168.1.249
0	Gene		Notifications			Subnet M	ask		255.255.255.0
۸A	Displa	8	Control Center			Router			192.168.1.1
-	Wallp	C	Do Not Disturb			DNS			
	Sound	0	General			Search Do	mains		
<b>.</b>	Touch		Display & Brightnes	s		Client ID			
	Driver		Walipaper						
U	Privat	<b>(</b> )	Sounds			Renew Le	ase		
	iClour	Ø	Touch ID & Passco	de		HTTP PROX	e in the second s		
	TC IOU	۲	Privacy			Off		Manual	Auto
<u>e</u>	Ilune								
-	Passt		iCloud						
_			iTunes & App Store						
	Mail,	-	Passbook & Apple	Pay					
	Notes		Mail. Contacts. Cal	endars					
	Remir	Ξ	Notes						
			Reminders						



### Over-the-Air WLAN Express Setup 3 Steps < 10 Minutes



## Logging into Mobility Express



Access Mobility Express using the controller's management IP address-Example: https://<controller\_mgmt\_ip\_addr>





Enter admin account username and password configured during the WLAN Express setup>

Apps For	quick access, plac	Authentication	Required			×	🗀 Ot	her bookmarks
		The server https:// password. The serv	172.20.229.4 /er says: Cisco	5:443 requires a o Controller.	username and			
		User Name: Password:	admin *******					
				Log In	Cancel			
	V	Vireles	s LA	N Co	ontro	lle	r	
	Welcom	el Please click the	login buttor	n to enter your	user name a	and pas	ssword	
			Lo	gin				
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## Network Summary



Displays high level view of Wireless Network



Network Summary shows count of Wireless Networks, Access Points, Clients, Rogues and Interferers in 2.4 and 5.0 GHz band



Graphical and Tabular representation of APs, OS, Clients, Application Visibility and Top WLANs



Add/Delete Widgets



## Monitoring – Access Points



Displays list of Access Points in the network; Inventory, Uptime, Usage etc.



Detailed Access Point view displays details AP information, Radio Performance summary, list of connected clients, etc.

Cisco Aironet 1850 Series Mobility Express Q AP or Client Search Save Configuration Monitoring Network Summary 📑 2.4GHz 📑 5GHz 🔁 Wireless Dashb AP Performance AIR-CAP702I-A-KS **Client Performance** F07F.0692.CC78 AIR-CAP2702I-A-K9 5 GB (-89) 🝸 Best Practices AIR-CAP1702I-A-K9 361 MB 28 AIR-CAP3602E-A-K9 Wireless Setti ılıılı cısco Save Configuration 🔒 🔅 Cisco Aironet 1850 Series Mobility Express Q AP or Clie Hanagement 🚣 Advanced GENERAL ERFORMANCE SUMMARY 2.4GHz (Ch 1) 5GHz (Ch (60.64)) APC08C.600F.11BF nber of clients Min: 9 Mbps, Max: 217 Mbps Min: 6 Mbps, Max: 450 Mbps CONF ROOM SATURN 5 GB 8 GB MAC Addre c0:8c:60:0f:11:b 570 Kbps 1446 Kbps 172.20.229.57 IP Address CDP / LLDP 4 dBm 11 dBm Model / Domain AIR-CAP3602E-A-K9 / 802.11bg:-A 802.11a:-A (-85) (-95, -92) Serial Number FTX1738GKGS 802.11n 2.4GHz 5GHz Spatial Streams : 3(2.4GHz), 3(5.0GHz) Max, Data Rate : 450MBps(2.4GHz), 45 Max Capabilities raffic Enable Enable APC08C.600F.11BF DETAILS CLIENTS RE TROUBLESHOOT 5GHz NEIGHBOR AND ROGUE APS @ CLEAN AIR INTERFERERS @ Channel 5 6 7 8 6 7 Channel

## Monitoring – Clients



Displays list of Clients in the network; client type, client connection speed, Uptime etc.



Detail Client view displays Signal Quality, Device Type, Application Visibility, QoS, Security, Policy assignment etc.

Cisco Aironet 1850 Series Mobility Express Q AP or Client Search Save Configuration 🔒 🏚 Monitoring Network Summary Y AP Name V Client Type 🔁 Wireless Dashbo AP10F3.119C.FDA1 802.11n Apple-TV 0 Mbps Online AP Performance 172.20.229.33 APC08C.600F.11BF 802.11n Windows7-Works... 0 Mbps Online 10 Minutes 14 Se... Client Performance 4 1 ► ► 25 ▼ items per page T Best Practices Cisco Aironet 1850 Series Mobility Express Q AP or Client Search Save Configuration 🛛 🛔 🍄 GENERAL OP APPLICATIONS .11 User Name Name Usage % Usage Unknown ↔ sip-tls 11.7 KB 43.7% Host Name http 7.9 KB 29.53% admin-PC ↔ unknow 5.8 KB 1.4 KB MAC Address 24:77:03:92:5e:58 ↔ dns Associated since 11 Minutes 47 Seconds SSID ME-EMPLOYEE-PSK AP Name APC08C.600F.11BF (64) Nearest APs AP38ED.18CC.2E30 AP38ED 18CC 2E40 AP38ED.18CC.2EE0 Device Type Windows7-Workstation Performance Signal Strength: -42 dBm Signal Quality: 51 dB Connection Speed: 30 Capabilities 802.11n (5GHz) (CCXv4) Spatial Stream: 2 NETWORK QOS Description Status Descriptio Status IP Address 172.20.229.33 Supported IPv6 Addres J-APSD VLAN Gold Mobility Bole Local SECURITY & POLICY Description Status CONNECTIVITY PING TEST RSN (WPA2) Cipher CCMP (AES) Key Management PSK EAP Type N/A Onlin Association Authentication DHC None/None mDNS Profile None AAA Role None

## **Best Practices**



Best Practices are enabled by default at Day 0



Best Practices relevant to Mobility Express deployments are displayed



For few Best Practices (Ex. NTP), Manual Configuration will link to relevant page

A Manifasing	Cisco Aironet 1850 Series	Mobility Express	Q AP or Client Search	Save Configuration
Nonitoring     Network Summary				
Access Points	BEST PRACTICES	Best Practice Score	19/21	
Clients	INEBASTBUCTUBE			
🔁 Wireless Dashboard				
AP Performance	+ AVC Visibility	<b>e</b>		
Client Performance		<b>Š</b>		
🟆 Best Practices	Fast SSID			
🌣 Wireless Settings	+ HTTPs for Management			
<b>1</b>	+ Aironet IE	ě		
	Less Optimizations			
📥 Advanced				
	SECURITY			
	+ WLAN with 802.1X/WPA2	Ø		
	+ Rogue Policies	<b>Ø</b>		
	+ Min Rogue RSSI Threshold	<b>Ø</b>		
	+ SSH/Telnet Access	<b>Ø</b>		
	+ Client Exclusion	<b>Ø</b>		
	Legacy IDS	<b>Ø</b>		
	+ Local Management Password Policies	<b>e</b>		
	+ User login policies	<b>I</b>		
	- Less Optimizations			
	BE MANAGEMENT			
	+ High SSID Counts	•		
	Client Bandselect	2		
	Auto Dynamic Channel Assignment	<b>~</b>		
	+ Auto Transmit Power Control	0		
	+ Auto Coverage Hole Detection	Ø		
	+ CleanAir Detection	0		
	+ Event Driven RRM	0		
	Less Optimizations			

## Wireless Setting - WLAN



Лах	WLAN	count	supported	is	16
	••=	000110	Cappontoa		



Security Type – Open, WPA2 - PSK, WPA2 Enterprise, Guest



WLAN to VLAN Mapping, ACL Rules



Application Visibility is enabled for each WLAN



Add N	ew WLAN		Add N			×
General	WLAN Security	VLAN & Fire				
			General	WLAN Security	VLAN & Firewall	QoS
	WLAN Id	4			-	
	Profile Name *					
	SSID *			Security	WPA2 Personal	•
	Admin State	Enabled		Shared Key *	Open	
	Radio Policy	ALL				
					WPA2 Enterprise	
					Guest	∕

## Wireless Setting – WLAN Users



Add, Modify, Delete WLAN users for 802.1x local authentication



Add, Modify, Delete Guest Users



⊕ Add WL	AN User					
	User Name	Guest User	Lifetime (Seconds)	WLAN Profile	Password	Description
	john		0	ME-EMPLOYEE V	·····	Employee
C ×	tim	Yes	864000	WLAN-POD5- New Confirm	Password .	Guest

## Wireless Setting – Guest WLAN

$\bigcirc$	

Local Web Auth. with local guest users Guest Access is for 24 Hours, not configurable



No Lobby Ambassador No customized Web Auth. page

🕐 Monitoring	Cisco Aironet 1850 S	Q AP or Client Search	Save Configuration 🛔 🔅	
Wireless Settings	GUEST WLAN			
🖺 Access Points				
📽 WLAN Users				
😁 Guest WLANs				
📩 Management	Enabled			
📩 Advanced		]		
	Display Cisco Logo	Yes (Default) •		
	Redirect URL After Login	http://www.cisco.com		
	Page Headline	Welcome to Guest Portal		
	Page Message	Powered by Cisco Mobility Express		
		Apply		

## Management – Access



### Supported via HTTP, HTTPS, Telnet, SSHv2



HTTPS, SSHv2 enabled by default

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* *	Wireless Settings Management • Access * Admin Accounts • Time • Software Update Advanced		ACCESS 2	Disabled (De	efault)	•			
			HTTPS Access Telnet Access SSHv2 Access	Enabled (De Disabled (De Enabled (De Apply	efault) efault) efault)	•			



## Software Update

## Management – Software Update



Software Update supported via TFTP. TFTP parameters must be configured on Web UI.



Mobility Express controller does not store AP images. AP images are stored on TFTP server.



Controller maintains mapping of APs to AP images. Maximum of five concurrent software downloads on Access Points



'Update Now' initiates pre-download image on all APs from TFTP server. Manual Reboot is required.



'Schedule Later' initiates pre-download image on all APs from TFTP server. Reboot happens as per 'Set Reboot Time'



Software download is non service impacting





## Conversion

- 1. CAPWAP to Mobility Express
- 2. Mobility Express to CAPWAP

## Conversion



Supported on 1800 series access points from 8.1.122.0 version



Download Mobility Express capable *AIR-AP1850-K9-<version>.tar* file from CCO on TFTP server



CAPWAP to Mobility Express CLI AP#ap-type mobility-express tftp://<TFTP server IP address>/<mobility express capable AP tar image>



Mobility Express to CAPWAP <u>AP#ap-type capwap</u>

#### **Download Software**

Download Cart (1 items) [+] Feedback Help

ownloads Home > Products > Wireless > Access Points > Aironet 1850 Series Access Points > Aironet 1850 Access Points > Cisco Mobility Express-8.1.122.0

Aironet 1850i Access Points

Search	Release 8.1.122.0			Release Notes	for 8.1.122.0	Add Device	e cation
Latest	File Information	Release Date	*	Size			
All Releases ▶ 8.1	Cisco 1850 Series Mobility Express Release 8.1 Software,to be used for convers ion from Lightweight Access Points only. AIR-AP1850-K9-8.1.122.0.tar	26-SEP-2015		30.05 MB		Download Add to cart	
						Publish	
	Cisco 1850 Series Mobility Express Release 8.1 Software. Access Point image b	26-SEP-2015		141.22 MB		Download	
	AIR-AP1850-K9-ME-8-1-122-0.zip					Add to cart	
						Publish	

## Conversion – CAPWAP to Mobility Express

### Output of <sh version> on AP

CASE 1 : CAPWAP image

AP Image version (active) : 8.1.10.159 AP Image version (backup) : 0.0.0.0

### CASE 2 : ME image = YES, ME Capable = NO

AP Running Image	: 8.1.123.15
Primary Boot Image	: 8.1.123.15
Backup Boot Image	: 8.1.10.159
AP Image type 🛛 :	MOBILITY EXPRESS IMAGE
AP Configuration :	NOT MOBILITY EXPRESS CAPABLE

### CASE 3 : ME image = YES, ME Capable = YES

AP Running Image	: 8.1.123.15
Primary Boot Image	: 8.1.123.15
Backup Boot Image	: 8.1.122.0
AP Image type :	MOBILITY EXPRESS IMAGE
AP Configuration :	MOBILITY EXPRESS CAPABLE



Conversion is needed #ap-type mobility-express tftp://<TFTP IP Address/<image>



Conversion is needed #ap-type mobility-express tftp://<TFTP IP Address/<image> #ap-type mobility-express tftp [same image version]



Conversion is NOT needed

## Conversion – Mobility Express to CAPWAP

### Output of <sh version> on AP

### CASE 1 : ME image = YES, ME Capable = YES

AP Running Image	: 8.1.123.15
Primary Boot Image	: 8.1.123.15
Backup Boot Image	: 8.1.122.0
AP Image type :	MOBILITY EXPRESS IMAGE
AP Configuration :	MOBILITY EXPRESS CAPABLE

### CASE 2 : ME image = YES, ME Capable = NO

AP Running Image : 8.1.123.15 Primary Boot Image : 8.1.123.15 Backup Boot Image : 8.1.10.159 AP Image type : MOBILITY EXPRESS IMAGE AP Configuration : NOT MOBILITY EXPRESS CAPABLE

### CASE 3 : CAPWAP image

AP Image version (active) : 8.1.10.159 AP Image version (backup) : 0.0.0.0



Conversion is needed #ap-type capwap



Conversion is NOT needed



Conversion is **NOT** needed



# Mobility Express Failover and Master Election

## Master Election



Only 1800 series access points with AP Type as MOBILITY EXPRESSS CAPABLE will participate in Master Election



Master Election and client connectivity is restored in a less than 2 minutes



SSO is not supported



Standalone mode is currently not supported on 1800 APs



Standalone mode on 1700, 2700, 3700 etc. Access Points will continue to service existing clients





## Interoperability





## CMX 10.2 (Presence) support for Mobility Express



## Prime Infrastructure (3.0.1) support for Mobility Express



### Add Mobility Express Controller IP in PI



### View AP details, WLANs etc.

cisco Prime Infrastructure	)				O ▼ Application Search	. ♦ 😣 1	4 root -	ROOT-DOMAIN
/ Device Type / Wireless (	Controller / Cis	co Mobility Express	/ MobilityExpress	*				0
Device Details Configuration	Applied/Scheduled	Templates Configura	ation Archive Image	e Latest Config Audit F	Report			
Features	WLAN Con	figuration				S	elect a comma	and 🛊 Go
< * `≣						т	otal Entries 3	
O Search All		D Profile_Name	SSID	WLAN/Guest/Remote LAN	Security Policies	Admin Status	Task List	
DHCP	0.1	ME-EMPLOYEE-PSK	ME-EMPLOYEE-PSK	WLAN	[WPA + WPA2] [Auth( PSK)]	Enabled	N/A	
General - System	□ 3	ME-WPA2-ACS	ME-WPA2-ACS	WLAN	[WPA + WPA2] [Auth( 802.1X)]	Enabled	N/A	
Global CDP Configuration	0 6	WLAN-POD5-ME-GUEST	WLAN-POD5-ME-GUEST	r wlan	WEB-Auth	Enabled	N/A	
Interface Groups						Т	otal Entries 3	
Interfaces								
Mobility Groups								
Multicast								
Network Route								
Network Time Protocol	1							
QoS Profiles								
User Roles								
▼ WLANs								
Policy Configuration								
WLAN Configuration								

😑 🖞		🔍 🗸 Application Search : 🛛 🐥 😣 14 root - ROOT-DOMAIN 🌣
Inventory / Device Manage     Device Groups	Perment / Network Devices  Device Groups / Device Type / Wireless Controller Ciscro, Mohility, Express.	Salarian (1/ Tatal 1 ) (7 ) (7 )
<ul> <li>← * 注 +</li> <li>Q<sub>4</sub> Search All</li> <li>All Devices ()</li> <li>* Device Type ()</li> <li>• United AP ()</li> <li>• Wireless Controller ()</li> <li>©isco Mobility Express ()</li> </ul>	Delete     Zelit     Sync     Groups & Sites     Reboot     D       Device     A Reacha     IP Address/DNS     Device Type A	ownload v Configure v D Show Quick Filter v T P Disc Software Inventory Collection Admin Status Last Inventory f
	MobilityEx ☑ 172.20.229.45	ompleted 8.1.121.0 28-SEP-15 18:25:27 Managed Completed

😑 號 Prime Infrastru	O <sub>s</sub> v Ap	plication Search	🔶 🐥 😣	14 root - R	OOT-DOMAIN 🏠							
ስ 🛛 Inventory / Device Management / Network Devices 🛧 🛛 🕹 🥥												
Device Groups Device Type Unified AP Selected 0,									Selected 0 / To	tai 18 💭 🌣 -		
← * 1≣ +	$\left[\times\right]$	Delete 🖉 E	dit Sync	Groups & Sites	Config	ure 🔻 Monitor 🔻	Add Device		>> Show	Quick Filter	<b>• 7</b>	
O Search All		AP Name	Ethernet M	IP Address	Controller IP	AP Model	Operationa	Software V	AP Location	Admin Stat	AP Type	
All Devices (j)							Registere ×					
▼ Device Type (j)												
Unified AP ()		AP10F3.11	10:f3:11:9c:fd:	172.20.229.	172.20.229.45	AIR-CAP2602I-A-K9	Registered	8.1.121.0	MARS	Enable	CAPWAP	
▼ Wireless Controller (j)		AP1830-SU	b0:aa:77:92:7ε	172.20.229. <i>(i)</i>	172.20.229.45	AIR-AP1832I-B-K9	Registered	8.1.121.0	default location	Enable	CAPWAP	
Cisco Mobility Express (j)		AP38ED.18	38:ed:18:cc:2e	172.20.229.(j)	172.20.229.45	AIR-AP1852I-B-K9	Registered	8.1.121.0	CONF ROOM SUN	Enable	CAPWAP	
► Location ③		AP5006.04	50:06:04:2e:0€	172.20.229.()	172.20.229.45	AIR-CAP702I-A-K9	Registered	8.1.121.0	RESTROOM	Enable	CAPWAP	
User Defined 🥡		AP7C0E.C	7c:0e:ce:f5:af:!	172.20.229.(j)	172.20.229.45	AIR-CAP1702I-A-K9	Registered	8.1.121.0	CONF ROOM PLUTO	Enable	CAPWAP	

e this Prime Infrastructure									n Search 🛛 🐥 😣	14 root - R	OOT-DOMAIN 🔅
•	n Monitor / Wireless Technologies / Access Point Radios 🛲 🔺										00
	Generate report for selected APs										
										14	Entries 1 - 50 of 52
	AP Name	Ethernet MAC	IP Address	Radio	Controller	Controller Name	AP Model	AP Mode	Radio Client Count 🔻	Admin Status	Oper Status
	APF07F.0692.CC78	f0:7f:06:92:cc:78	172.20.229.33	802.11a/n/ac	172.20.229.45	MobilityExpress	AIR-CAP2702I-A-K9	FlexConnect	1	Enabled	Up
	APB0AA.7792.76D0	b0:aa:77:92:76:d0	172.20.229.60	802.11a/n/ac	172.20.229.45	MobilityExpress	AIR-AP1852I-UXK9	FlexConnect	1	Enabled	Up
	AP38ED.18CC.2E30	38:ed:18:cc:2e:30	172.20.229.59	802.11a/n/ac	172.20.229.45	MobilityExpress	AIR-AP1852I-B-K9	FlexConnect	1	Enabled	Up

