

# Dépannez les vitesses 802.11n

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## Introduction

Ce document couvre les problèmes courants à prendre en compte lors du dépannage des problèmes de débit sans fil. Ce document comporte l'utilisation des outils pour mesurer la représentation et le débit du réseau Sans fil, qui inclut les Points d'accès du différent constructeur 802.11n (aps) en comparaison de Cisco 1252 AP dans les conditions de test semblables.

## Conditions préalables

### Conditions requises

Cisco recommande que vous ayez ces conditions requises :

- Outils tels que l'iPerf, et analyseurs de réseau tels qu'OmniPeek et analyse du spectre de Cisco
- 802.11n a pris en charge 1140, 1250, 3500, et la gamme 1260 aps

### Composants utilisés

Les informations contenues dans ce document sont basées sur les versions de matériel et de logiciel suivantes :

- Version de logiciel courante 6.0.182 de contrôleur de WS-SVC-WiSM
- AIR-LAP1142-A-K9 aps

### Conventions

Pour plus d'informations sur les conventions utilisées dans ce document, reportez-vous à [Conventions relatives aux conseils techniques Cisco](#).

## Informations générales

802.11n est dû né à un certain nombre de modifications apportées sur l'agrégation de vue aps : A-MPDU et A-MSDU.

- Taille du bloc ACK
- MCS et liaison de la Manche
- MIMO
- Utilisant 5GHz plus de 2.4 gigahertz : également le WiFi de mention certifie la liaison de canal sur 5GHz

## Dépannez le contrôleur pour les vitesses 11n

Procédez comme suit :

1. Vérifiez que le support 802.11n est activé sur le contrôleur. (WiSM-slot3-2) >show 802.11a

```
802.11a Network..... Enabled
11nSupport..... Enabled
802.11a Low Band..... Enabled
802.11a Mid Band..... Enabled
802.11a High Band..... Enabled
802.11a Operational Rates
802.11a 6M Rate..... Mandatory
802.11a 9M Rate..... Supported
802.11a 12M Rate..... Disabled
802.11a 18M Rate..... Supported
802.11a 24M Rate..... Mandatory
802.11a 36M Rate..... Supported
802.11a 48M Rate..... Supported
802.11a 54M Rate..... Supported
802.11n MCS Settings:
MCS 0..... Supported
MCS 1..... Supported
MCS 2..... Supported
MCS 3..... Supported
MCS 4..... Supported
MCS 5..... Supported
```

2. Des débits N sont atteints deux manières. Accélère à la structure de codage de modulation (MCS) 7 peut être atteint sans utiliser la liaison de canal. Pour des MCS évalué au-dessus de 7 et jusqu'à 15, liaison de canal doit être activés. Vous pouvez vérifier si la liaison de canal est activée utilisant cette **commande show** sur le contrôleur :

```
(WiSM-slot3-2) >show
advanced 802.11a channel
Automatic Channel Assignment
Channel Assignment Mode..... AUTO
Channel Update Interval..... 600 seconds [startup]
Anchor time (Hour of the day)..... 0
Channel Update Contribution..... SNI.
Channel Assignment Leader..... 00:1d:45:f0:d2:c0
Last Run..... 371 seconds ago
DCA Sensitivity Level..... STARTUP (5 dB)
DCA 802.11n Channel Width..... 40 MHz
Channel Energy Levels
```

```

Minimum..... unknown
Average..... unknown
Maximum..... unknown
Channel Dwell Times
Minimum..... unknown
Average..... unknown
Maximum..... unknown
802.11a 5 GHz Auto-RF Channel List
Allowed Channel List.....
36,40,44,48,52,56,60,64,149,
153,157,161
Unused Channel List.....
100,104,108,112,116,132,136,

```

### 3. Vous pouvez également configurer la largeur de canal par AP utilisant ces commandes

```

:(WiSM-slot3-2) >show advanced 802.11a channel
Automatic Channel Assignment
Channel Assignment Mode..... AUTO
Channel Update Interval..... 600 seconds [startup]
Anchor time (Hour of the day)..... 0
Channel Update Contribution..... SNI.
Channel Assignment Leader..... 00:1d:45:f0:d2:c0
Last Run..... 371 seconds ago
DCA Sensitivity Level..... STARTUP (5 dB)
DCA 802.11n Channel Width..... 40 MHz
Channel Energy Levels
Minimum..... unknown
Average..... unknown
Maximum..... unknown
Channel Dwell Times
Minimum..... unknown
Average..... unknown
Maximum..... unknown
802.11a 5 GHz Auto-RF Channel List
Allowed Channel List.....
36,40,44,48,52,56,60,64,149,
153,157,161
Unused Channel List.....
100,104,108,112,116,132,136,

```

### 4. L'intervalle de protection et l'aide correspondante de débits MCS déterminent les débits de données qui sont vus sur les clients 802.11n. Ce sont les commandes de vérifier cette

```

configuration ::(WiSM-slot3-2) >show 802.11a
802.11a Network..... Enabled
11nSupport..... Enabled
802.11a Low Band..... Enabled
802.11a Mid Band..... Enabled
802.11a High Band..... Enabled
802.11a Operational Rates
802.11a 6M Rate..... Mandatory
802.11a 9M Rate..... Supported
802.11a 12M Rate..... Disabled
802.11a 18M Rate..... Supported
802.11a 24M Rate..... Mandatory
802.11a 36M Rate..... Supported
802.11a 48M Rate..... Supported
802.11a 54M Rate..... Supported
802.11n MCS Settings:
MCS 0..... Supported
MCS 1..... Supported
MCS 2..... Supported
MCS 3..... Supported
MCS 4..... Supported
MCS 5..... Supported

```

```

MCS 6..... Supported
MCS 7..... Supported
MCS 8..... Supported
MCS 9..... Supported
MCS 10..... Supported
MCS 11..... Supported
MCS 12..... Supported
MCS 13..... Supported
MCS 14..... Supported
MCS 15..... Supported
802.11n Status:
A-MPDU Tx:
Priority 0..... Enabled
Priority 1..... Disabled
Priority 2..... Disabled
Priority 3..... Disabled
Priority 4..... Disabled
Priority 5..... Disabled
Priority 6..... Disabled
Priority 7..... Disabled
Beacon Interval..... 100
CF Pollable mandatory..... Disabled
CF Poll Request mandatory..... Disabled
--More-- or (q)uit
CFP Period..... 4
CFP Maximum Duration..... 60
Default Channel..... 36
Default Tx Power Level..... 1
DTPC Status..... Enabled
Fragmentation Threshold..... 2346
Pico-Cell Status..... Disabled
Pico-Cell-V2 Status..... Disabled
TI Threshold..... -50
Traffic Stream Metrics Status..... Disabled
Expedited BW Request Status..... Disabled
World Mode..... Enabled
EDCA profile type..... default-wmm
Voice MAC optimization status..... Disabled
Call Admission Control (CAC) configuration
Voice AC - Admission control (ACM)..... Enabled
Voice max RF bandwidth..... 75
Voice reserved roaming bandwidth..... 6
Voice load-based CAC mode..... Enabled
Voice tspec inactivity timeout..... Disabled
Video AC - Admission control (ACM)..... Disabled
Voice Stream-Size..... 84000
Voice Max-Streams..... 2
Video max RF bandwidth..... Infinite
Video reserved roaming bandwidth..... 0

```

Assurez l'agrégation de paquet A-MPDU.  
Pour le meilleur effort, des niveaux de QoS sont activés par l'intermédiaire de ces  
commandes :**enable prioritaire 0 de tx d'a-mpdu du config 802.11a 11nSupportenable  
prioritaire 0 de tx d'a-mpdu du config 802.11b 11nSupport**

5. Chacune des trois Antennes sur la radio A doit être utilisé. Assurez-vous que les Antennes sont le même modèle.
6. Sur le WLAN configuré pour la Connectivité de client, WMM devrait être permis ou exigé, et AES ou cryptage ouvert seulement doit être utilisé. Ceci peut être vérifié utilisant cette sortie de commande :

```

:(WiSM-slot2-2) >show wlan 1
WLAN Identifier..... 1
Profile Name..... wlab5WISMip22
Network Name (SSID)..... wlab5WISMip22
Status..... Enabled

```

```

MAC Filtering..... Disabled
Broadcast SSID..... Enabled
AAA Policy Override..... Disabled
Network Admission Control
NAC-State..... Disabled
Quarantine VLAN..... 0
Number of Active Clients..... 0
Exclusionlist Timeout..... 60 seconds
Session Timeout..... 1800 seconds
CHD per WLAN..... Enabled
Webauth DHCP exclusion..... Disabled
Interface..... management
WLAN ACL..... unconfigured
DHCP Server..... Default
DHCP Address Assignment Required..... Disabled
Quality of Service..... Silver (best effort)
WMM..... Allowed
CCX - AironetIe Support..... Enabled
CCX - Gratuitous ProbeResponse (GPR)..... Disabled
CCX - Diagnostics Channel Capability..... Disabled
Dot11-Phone Mode (7920)..... Disabled
Wired Protocol..... None
IPv6 Support..... Disabled
Peer-to-Peer Blocking Action..... Disabled
Radio Policy..... All
DTIM period for 802.11a radio..... 1
DTIM period for 802.11b radio..... 1
Radius Servers
Authentication..... Global Servers
Accounting..... Disabled
Local EAP Authentication..... Disabled
Security
802.11 Authentication:..... Open System
Static WEP Keys..... Disabled
802.1X..... Disabled
Wi-Fi Protected Access (WPA/WPA2)..... Enabled
WPA (SSN IE)..... Disabled
WPA2 (RSN IE)..... Enabled
TKIP Cipher..... Disabled
AES Cipher..... Enabled
Auth Key Management
802.1x..... Enabled
PSK..... Disabled
CCKM..... Disabled
FT(802.11r)..... Disabled
FT-PSK(802.11r)..... Disabled
FT Reassociation Timeout..... 20
FT Over-The-Air mode..... Enabled
FT Over-The-Ds mode..... Enabled
CKIP ..... Disabled
IP Security..... Disabled
IP Security Passthru..... Disabled
Web Based Authentication..... Disabled
Web-Passthrough..... Disabled
Conditional Web Redirect..... Disabled
Splash-Page Web Redirect..... Disabled
Auto Anchor..... Disabled
H-REAP Local Switching..... Enabled
H-REAP Learn IP Address..... Enabled
Infrastructure MFP protection..... Enabled (Global
Infrastructure
MFP Disabled)
Client MFP..... Optional
Tkip MIC Countermeasure Hold-down Timer..... 60

```

Call Snooping..... Disabled  
Band Select..... Enabled  
Load Balancing..... Enabled

7. Diversité d'antenne : si à l'aide de seulement deux Antennes pour une raison quelconque, vous devez utiliser l'antenne A et B pour des ports d'émetteur/récepteur.

#### Sur le côté client :

1. Suppliant utilisé pour contrôler la carte Sans fil, préférée pour appairer le constructeur du suppliant à la carte Sans fil.
2. Pilotes client : vous devez s'assurer que les plus récents pilotes client s'exécutent sur les cartes Sans fil.
3. Contactez votre constructeur Sans fil d'adaptateur.
4. Assurez-vous que vous utilisez 11n avez certifié l'adaptateur pour réaliser les débits de données 11n.

#### Produits certifiés de WiFi :

[http://www.wi-fi.org/certified\\_products.php](http://www.wi-fi.org/certified_products.php)

#### Comment améliorer la représentation :

1. Utilisation de la Manche — Les analyseurs de réseau signalent l'utilisation de canal dans le pourcentage de transmettre passée par temps et de recevoir des trames. Ceci aide à mesurer la variance potentielle dans la vitesse devant distancer d'un Point d'accès. Ceci aidera à surveiller et voir par exemple, si un canal est entièrement transmission occupée à 1Mbps dans des conditions idéales exécuterait à 0.94Mbps au-dessous de l'utilisation de 100%.
2. Le support physique utilisé dans la radio dicte aussi bien les représentations. Utilisant 802.11g ou 802.11a au-dessus de 802.11b offre à beaucoup des hauts débits, souvent jusqu'à 30 mbps au-dessus de 802.11b où une capacité de la radio 6mpbs est divisée entre toutes les stations associées.
3. Tailles de cellules — Elles sont recommandées pour rétrécir les tailles de cellules pour avoir les clients comme plus près des aps comme possibles. Ceci bénéficiera les débits de données auxquels le client peut se connecter à AP. Ceci peut être fait en ramenant les niveaux de puissance sur AP au plus bas.
4. La taille craintive de cellules diminue également l'interférence de co-canal. Si utilisant RRM, les aps devraient sélectionner des canaux dynamiquement par déploiement. Cependant, si mettant en application l'affectation dynamique de canal, assurez-vous que vous n'avez pas deux aps aux niveaux de puissance élevés sur la même droite de canal l'un à côté de l'autre.
5. La protection fait également frapper le débit.

#### [Comment calculer le débit par l'intermédiaire de l'iPerf](#)

#### [Conseils d'installation d'lperf](#)

Pour ces clients ou testeurs qui ne possèdent pas le char, lperf peut être utilisé à la place. C'est disponible chez [http://www.macalester.edu/crash/software/pc/lperf/kperf\\_setup.exe](http://www.macalester.edu/crash/software/pc/lperf/kperf_setup.exe).

#### [Débit de mesure de TCP](#)

Exécutez cette commande sur le côté serveur :

```
(WiSM-slot2-2) >show wlan 1
WLAN Identifier..... 1
Profile Name..... wlab5WISMip22
Network Name (SSID)..... wlab5WISMip22
Status..... Enabled
MAC Filtering..... Disabled
Broadcast SSID..... Enabled
AAA Policy Override..... Disabled
Network Admission Control
NAC-State..... Disabled
Quarantine VLAN..... 0
Number of Active Clients..... 0
Exclusionlist Timeout..... 60 seconds
Session Timeout..... 1800 seconds
CHD per WLAN..... Enabled
Webauth DHCP exclusion..... Disabled
Interface..... management
WLAN ACL..... unconfigured
DHCP Server..... Default
DHCP Address Assignment Required..... Disabled
Quality of Service..... Silver (best effort)
WMM..... Allowed
CCX - AironetIe Support..... Enabled
CCX - Gratuitous ProbeResponse (GPR)..... Disabled
CCX - Diagnostics Channel Capability..... Disabled
Dot11-Phone Mode (7920)..... Disabled
Wired Protocol..... None
IPv6 Support..... Disabled
Peer-to-Peer Blocking Action..... Disabled
Radio Policy..... All
DTIM period for 802.11a radio..... 1
DTIM period for 802.11b radio..... 1
Radius Servers
Authentication..... Global Servers
Accounting..... Disabled
Local EAP Authentication..... Disabled
Security
802.11 Authentication:..... Open System
Static WEP Keys..... Disabled
802.1X..... Disabled
Wi-Fi Protected Access (WPA/WPA2)..... Enabled
WPA (SSN IE)..... Disabled
WPA2 (RSN IE)..... Enabled
TKIP Cipher..... Disabled
AES Cipher..... Enabled
Auth Key Management
802.1x..... Enabled
PSK..... Disabled
CCKM..... Disabled
FT(802.11r)..... Disabled
FT-PSK(802.11r)..... Disabled
FT Reassociation Timeout..... 20
FT Over-The-Air mode..... Enabled
FT Over-The-Ds mode..... Enabled
CKIP ..... Disabled
IP Security..... Disabled
IP Security Passthru..... Disabled
Web Based Authentication..... Disabled
Web-Passthrough..... Disabled
Conditional Web Redirect..... Disabled
Splash-Page Web Redirect..... Disabled
```

```

Auto Anchor..... Disabled
H-REAP Local Switching..... Enabled
H-REAP Learn IP Address..... Enabled
Infrastructure MFP protection..... Enabled (Global
Infrastructure
MFP Disabled)
Client MFP..... Optional
Tkip MIC Countermeasure Hold-down Timer..... 60
Call Snooping..... Disabled
Band Select..... Enabled
Load Balancing..... Enabled

```

Exécutez cette commande sur le côté client :

```

(WiSM-slot2-2) >show wlan 1
WLAN Identifier..... 1
Profile Name..... wlab5WISMip22
Network Name (SSID)..... wlab5WISMip22
Status..... Enabled
MAC Filtering..... Disabled
Broadcast SSID..... Enabled
AAA Policy Override..... Disabled
Network Admission Control
NAC-State..... Disabled
Quarantine VLAN..... 0
Number of Active Clients..... 0
Exclusionlist Timeout..... 60 seconds
Session Timeout..... 1800 seconds
CHD per WLAN..... Enabled
Webauth DHCP exclusion..... Disabled
Interface..... management
WLAN ACL..... unconfigured
DHCP Server..... Default
DHCP Address Assignment Required..... Disabled
Quality of Service..... Silver (best effort)
WMM..... Allowed
CCX - AironetIe Support..... Enabled
CCX - Gratuitous ProbeResponse (GPR)..... Disabled
CCX - Diagnostics Channel Capability..... Disabled
Dot11-Phone Mode (7920)..... Disabled
Wired Protocol..... None
IPv6 Support..... Disabled
Peer-to-Peer Blocking Action..... Disabled
Radio Policy..... All
DTIM period for 802.11a radio..... 1
DTIM period for 802.11b radio..... 1
Radius Servers
Authentication..... Global Servers
Accounting..... Disabled
Local EAP Authentication..... Disabled
Security
802.11 Authentication:..... Open System
Static WEP Keys..... Disabled
802.1X..... Disabled
Wi-Fi Protected Access (WPA/WPA2)..... Enabled
WPA (SSN IE)..... Disabled
WPA2 (RSN IE)..... Enabled
TKIP Cipher..... Disabled
AES Cipher..... Enabled
Auth Key Management
802.1x..... Enabled
PSK..... Disabled
CCKM..... Disabled
FT(802.11r)..... Disabled

```



```

FT-PSK(802.11r)..... Disabled
FT Reassociation Timeout..... 20
FT Over-The-Air mode..... Enabled
FT Over-The-Ds mode..... Enabled
CKIP ..... Disabled
IP Security..... Disabled
IP Security Passthru..... Disabled
Web Based Authentication..... Disabled
Web-Passthrough..... Disabled
Conditional Web Redirect..... Disabled
Splash-Page Web Redirect..... Disabled
Auto Anchor..... Disabled
H-REAP Local Switching..... Enabled
H-REAP Learn IP Address..... Enabled
Infrastructure MFP protection..... Enabled (Global
Infrastructure
MFP Disabled)
Client MFP..... Optional
Tkip MIC Countermeasure Hold-down Timer..... 60
Call Snooping..... Disabled
Band Select..... Enabled
Load Balancing..... Enabled

```

```

-----
Server listening on TCP port 5001
TCP window size: 256 KByte
-----
Client connecting to 10.10.10.10, TCP port 5001
TCP window size: 256 KByte
-----
[1788] local 10.10.10.20 port 1155 connected with 10.10.10.10 port 5001
[1820] local 10.10.10.20 port 1153 connected with 10.10.10.10 port 5001
[1868] local 10.10.10.20 port 1150 connected with 10.10.10.10 port 5001
[1836] local 10.10.10.20 port 1152 connected with 10.10.10.10 port 5001
[1804] local 10.10.10.20 port 1154 connected with 10.10.10.10 port 5001
[1852] local 10.10.10.20 port 1151 connected with 10.10.10.10 port 5001
[ ID] Interval      Transfer      Bandwidth
[1788] 0.0-60.1 sec    124 MBytes   17.3 Mbits/sec
[1868] 0.0-60.1 sec    123 MBytes   17.1 Mbits/sec
[1820] 0.0-60.2 sec    110 MBytes   15.4 Mbits/sec
[1804] 0.0-60.1 sec    84.6 MBytes  11.8 Mbits/sec
[1852] 0.0-60.1 sec    89.2 MBytes  12.4 Mbits/sec
[1836] 0.0-60.2 sec    86.3 MBytes  12.0 Mbits/sec
[SUM] 0.0-60.2 sec    617 MBytes   86.0 Mbits/sec
[1952] local 10.10.10.20 port 5001 connected with 10.10.10.10 port 2663
[1832] local 10.10.10.20 port 5001 connected with 10.10.10.10 port 2664
[1748] local 10.10.10.20 port 5001 connected with 10.10.10.10 port 2665
[1732] local 10.10.10.20 port 5001 connected with 10.10.10.10 port 2666
[1800] local 10.10.10.20 port 5001 connected with 10.10.10.10 port 2667
[1812] local 10.10.10.20 port 5001 connected with 10.10.10.10 port 2668
[ ID] Interval      Transfer      Bandwidth
[1800] 0.0-60.0 sec    114 MBytes   15.9 Mbits/sec
[1812] 0.0-60.0 sec    117 MBytes   16.3 Mbits/sec
[1952] 0.0-60.1 sec    89.6 MBytes  12.5 Mbits/sec
[1748] 0.0-60.1 sec    129 MBytes   18.1 Mbits/sec
[1732] 0.0-60.1 sec    111 MBytes   15.5 Mbits/sec
[1832] 0.0-60.1 sec    112 MBytes   15.6 Mbits/sec
[SUM] 0.0-60.1 sec    672 MBytes   93.8 Mbits/sec

```

Le nombre d'abord cerclé dans cette image représente le débit en amont, le deuxième nombre cerclé représente (AP au client) le débit en aval.

[Débit de mesure d'UDP](#)

Clôturez les applications précédentes d'Iperf sur le serveur et le côté client. Chacun des deux doivent être installés de nouveau, mais cette fois pour des essais de performances d'UDP.

Exécutez cette commande sur le côté serveur :

```
(WiSM-slot2-2) >show wlan 1
WLAN Identifier..... 1
Profile Name..... wlab5WISMip22
Network Name (SSID)..... wlab5WISMip22
Status..... Enabled
MAC Filtering..... Disabled
Broadcast SSID..... Enabled
AAA Policy Override..... Disabled
Network Admission Control
NAC-State..... Disabled
Quarantine VLAN..... 0
Number of Active Clients..... 0
Exclusionlist Timeout..... 60 seconds
Session Timeout..... 1800 seconds
CHD per WLAN..... Enabled
Webauth DHCP exclusion..... Disabled
Interface..... management
WLAN ACL..... unconfigured
DHCP Server..... Default
DHCP Address Assignment Required..... Disabled
Quality of Service..... Silver (best effort)
WMM..... Allowed
CCX - AironetIe Support..... Enabled
CCX - Gratuitous ProbeResponse (GPR)..... Disabled
CCX - Diagnostics Channel Capability..... Disabled
Dot11-Phone Mode (7920)..... Disabled
Wired Protocol..... None
IPv6 Support..... Disabled
Peer-to-Peer Blocking Action..... Disabled
Radio Policy..... All
DTIM period for 802.11a radio..... 1
DTIM period for 802.11b radio..... 1
Radius Servers
Authentication..... Global Servers
Accounting..... Disabled
Local EAP Authentication..... Disabled
Security
802.11 Authentication:..... Open System
Static WEP Keys..... Disabled
802.1X..... Disabled
Wi-Fi Protected Access (WPA/WPA2)..... Enabled
WPA (SSN IE)..... Disabled
WPA2 (RSN IE)..... Enabled
TKIP Cipher..... Disabled
AES Cipher..... Enabled
Auth Key Management
802.1x..... Enabled
PSK..... Disabled
CCKM..... Disabled
FT(802.11r)..... Disabled
FT-PSK(802.11r)..... Disabled
FT Reassociation Timeout..... 20
FT Over-The-Air mode..... Enabled
FT Over-The-Ds mode..... Enabled
CKIP ..... Disabled
IP Security..... Disabled
IP Security Passthru..... Disabled
Web Based Authentication..... Disabled
```

```

Web-Passthrough..... Disabled
Conditional Web Redirect..... Disabled
Splash-Page Web Redirect..... Disabled
Auto Anchor..... Disabled
H-REAP Local Switching..... Enabled
H-REAP Learn IP Address..... Enabled
Infrastructure MFP protection..... Enabled (Global
Infrastructure
MFP Disabled)
Client MFP..... Optional
Tkip MIC Countermeasure Hold-down Timer..... 60
Call Snooping..... Disabled
Band Select..... Enabled
Load Balancing..... Enabled

```

**Exécutez cette commande sur le côté client :**

```

(WiSM-slot2-2) >show wlan 1
WLAN Identifier..... 1
Profile Name..... wlab5WISMip22
Network Name (SSID)..... wlab5WISMip22
Status..... Enabled
MAC Filtering..... Disabled
Broadcast SSID..... Enabled
AAA Policy Override..... Disabled
Network Admission Control
NAC-State..... Disabled
Quarantine VLAN..... 0
Number of Active Clients..... 0
Exclusionlist Timeout..... 60 seconds
Session Timeout..... 1800 seconds
CHD per WLAN..... Enabled
Webauth DHCP exclusion..... Disabled
Interface..... management
WLAN ACL..... unconfigured
DHCP Server..... Default
DHCP Address Assignment Required..... Disabled
Quality of Service..... Silver (best effort)
WMM..... Allowed
CCX - AironetIe Support..... Enabled
CCX - Gratuitous ProbeResponse (GPR)..... Disabled
CCX - Diagnostics Channel Capability..... Disabled
Dot11-Phone Mode (7920)..... Disabled
Wired Protocol..... None
IPv6 Support..... Disabled
Peer-to-Peer Blocking Action..... Disabled
Radio Policy..... All
DTIM period for 802.11a radio..... 1
DTIM period for 802.11b radio..... 1
Radius Servers
Authentication..... Global Servers
Accounting..... Disabled
Local EAP Authentication..... Disabled
Security
802.11 Authentication:..... Open System
Static WEP Keys..... Disabled
802.1X..... Disabled
Wi-Fi Protected Access (WPA/WPA2)..... Enabled
WPA (SSN IE)..... Disabled
WPA2 (RSN IE)..... Enabled
TKIP Cipher..... Disabled
AES Cipher..... Enabled
Auth Key Management
802.1x..... Enabled

```

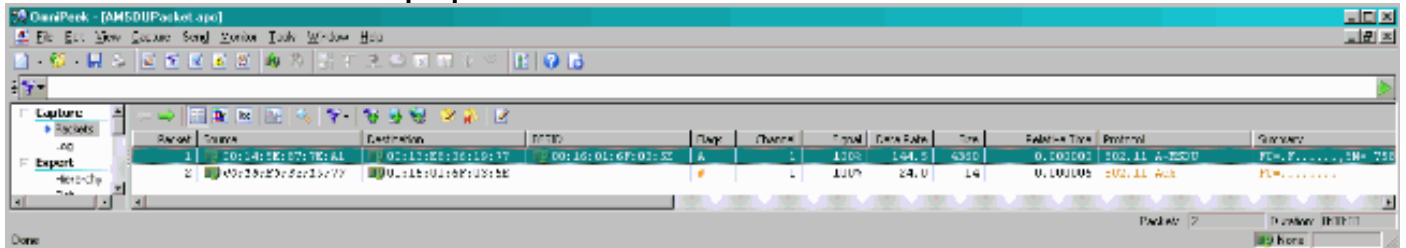
```

PSK..... Disabled
CCKM..... Disabled
FT(802.11r)..... Disabled
FT-PSK(802.11r)..... Disabled
FT Reassociation Timeout..... 20
FT Over-The-Air mode..... Enabled
FT Over-The-Ds mode..... Enabled
CKIP ..... Disabled
IP Security..... Disabled
IP Security Passthru..... Disabled
Web Based Authentication..... Disabled
Web-Passthrough..... Disabled
Conditional Web Redirect..... Disabled
Splash-Page Web Redirect..... Disabled
Auto Anchor..... Disabled
H-REAP Local Switching..... Enabled
H-REAP Learn IP Address..... Enabled
Infrastructure MFP protection..... Enabled (Global
Infrastructure
MFP Disabled)
Client MFP..... Optional
Tkip MIC Countermeasure Hold-down Timer..... 60
Call Snooping..... Disabled
Band Select..... Enabled
Load Balancing..... Enabled

```

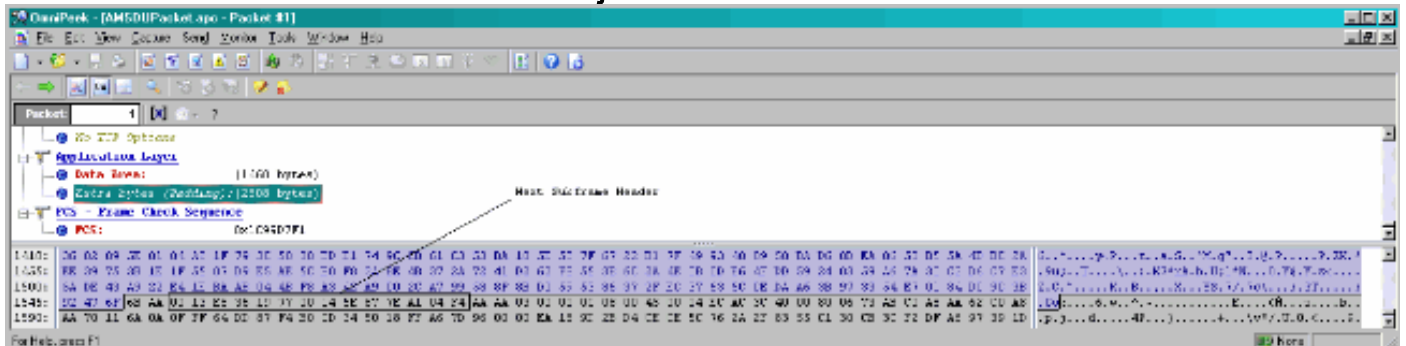
C'est un exemple des captures d'Omnipeek pour analyser l'unité de données de service d'agrégat de MAC :

### Le suivi A-MSDU affiche un paquet

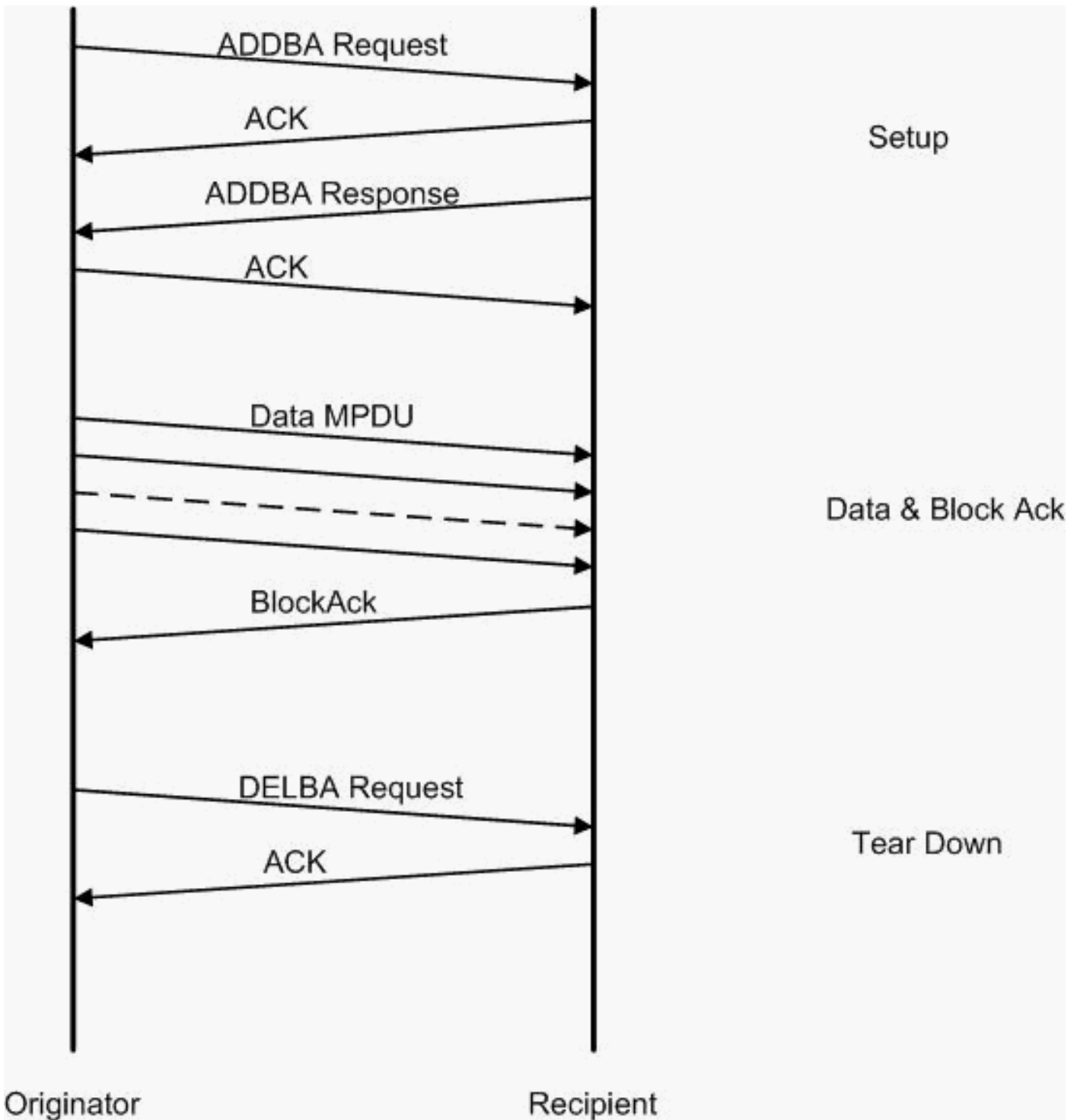


- Seulement la première sous trame est affichée.
- Devez examiner le vidage hexadécimal pour voir de sous trames supplémentaires.

### Prochaine sous trame A-MSDU affichée ajoutée

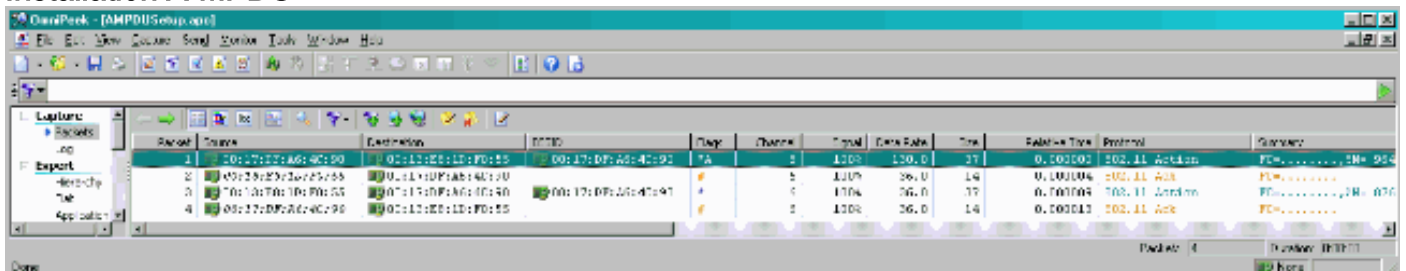


- Un A-MPDU est une structure qui contient plusieurs MPDUs, transportée comme PSDU simple par le PHY.
- Indication que le paquet est les données A-MPDU dans le système de convergence de niveau physique (PLCP).



C'est un exemple des captures d'Omnipeek pour analyser l'unité de données d'agrégat de protocole MAC :

### Installation A-MPDU



- ADDBA — Ajoutez l'accusé de réception de bloc
- Demande ADDBA — Contient l'identifiant, la stratégie du bloc ACK, la taille de mémoire

tampon, etc.

- Réponse ADDBA — Peut changer la stratégie et la taille de mémoire tampon.

## Installation A-MPDU

- Demande ADDBA
- AP1250 emploie un délai d'attente de zéro pour n'indiquer aucun délai d'attente.

The screenshot shows the OmniPeek interface for packet #1. The main pane displays the following details:

- 802.11 MAC Header**
  - Version: 0
  - Type: %00 Management
  - Subtype: %1101 Management Action
  - Frame Control Flags: %00000000
    - 0... .. Non-strict order
    - .0.. .. Non-Protected Frame
    - ..0. .... No More Data
    - ...0 .... Power Management - active mode
    - .... 0... This is not a Re-Transmission
    - .... .0.. Last or Unfragmented Frame
    - .... ..0. Not an Exit from the Distribution System
    - .... ...0 Not to the Distribution System
  - Duration: 40 Microseconds
  - Destination: 00:13:E8:1D:F0:55
  - Source: 00:17:DF:A6:4C:90
  - BSSID: 00:17:DF:A6:4C:90
  - Seq Number: 964
  - Frag Number: 0
- 802.11 Management - Action**
  - Category Code: 3 Block Ack
  - Action Code: 0 ADDBA Request
  - Dialog Token: 1
  - BlockAck Param Set: %0001000000000010
    - ..0000.. TID: 0
    - ..... ..1. BlockAck Policy: Immediate Block Ack
    - ..... ..0 A-MSDU: Not Permitted
  - BlockAck Timeout Value: 0 TUs
  - BA Starting Sequence Control: %0000001001010000
    - ..0000 Starting Seq Number: 37
    - ..... ..0000 Fragment Number: 0
- FCS - Frame Check Sequence**
  - FCS: 0x36E63FB9

At the bottom, the raw packet data is shown in hexadecimal and ASCII:

```
0000: D0 00 28 00 00 13 E8 1D F0 55 00 17 DF A6 4C 90 00 17 DF A6 4C ..{.....U...L....L
0021: 90 40 3C 03 00 01 02 10 00 00 50 02 36 E6 3F B9 .@<.....P.6.?.
```

## Installation A-MPDU

- Réponse ADDBA
- Le récepteur doit indiquer qu'accord du bloc ACK a été avec succès établi.

The screenshot shows the OmniPeek interface for packet #3. The main pane displays the following details:

- 802.11 MAC Header**
  - Version: 0
  - Type: %00 Management
  - Subtype: %1101 Management Action
  - Frame Control Flags: %00000000
    - 0... .. Non-strict order
    - .0.. .. Non-Protected Frame
    - ..0. .... No More Data
    - ...0 .... Power Management - active mode
    - .... 0... This is not a Re-Transmission
    - .... .0.. Last or Unfragmented Frame
    - .... ..0. Not an Exit from the Distribution System
    - .... ...0 Not to the Distribution System
  - Duration: 40 Microseconds
  - Destination: 00:17:DF:A6:4C:90
  - Source: 00:13:E8:1D:F0:55
  - BSSID: 00:17:DF:A6:4C:90
  - Seq Number: 876
  - Frag Number: 0
- 802.11 Management - Action**
  - Category Code: 3 Block Ack
  - Action Code: 1 ADDBA Response
  - Dialog Token: 1
  - Status Code: 0 Successful
  - BlockAck Param Set: %0001000000000010
    - --..... Buffer Size:64
    - ..... ..0000.. TID: 0
    - ..... .....1. BlockAck Policy: Immediate Block Ack
    - ..... .....0 A-MSDU: Not Permitted
  - BlockAck Timeout Value: 5000 TUs
- FCS - Frame Check Sequence**
  - FCS: 0x3DD891AF

At the bottom, the raw packet data is shown in hexadecimal and ASCII:

```

0000: D0 00 28 00 00 17 DF A6 4C 90 00 13 E8 1D F0 55 00 17 DF A6 4C ..(.....L.....U....L
0021: 90 C0 36 03 01 01 00 00 02 10 88 13 3D D8 91 AF ..6.....=...

```

## Transfert des données A-MPDU

- Le bloc ACK contient le bitmap comprimé pour indiquer que MPDUs a reçu.
- Référez-vous à la section 9.10.7" d'IEEE 802.11n les extensions HT-immédiates du bloc ACK » pour les informations sur envoyer le bloc ACK.



Packet	Source	Destination	Protocol	Flags	Channel	Signal	Data Rate	Size	Rate vs Time	Protocol
1	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.000200	TCP
2	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.00065	TCP
3	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.00098	TCP
4	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.00011	TCP
5	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.00014	TCP
6	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.00017	TCP
7	00:13:88:26:19:77	00:14:5E:97:7E:A2	00:16:01:0F:03:5E	A	1	100%	130.0	78	0.00020	TCP
8	00:16:01:0F:03:5E	00:13:88:26:19:77		A	1	100%	35.0	33	0.00073	003.11 BA

## Capacités annoncées dans des balises

**HT Capability Info**

Element ID: 45 HT Capability Info

Length: 26

**HT Capability Info:** %0001100001101110

- 0..... L-SIG TXOP Protection Support: Not Supported
- .0..... AP allows use of 40MHz Transmissions In Neighboring BSSs
- ..0..... Device/BSS does Not Support use of PSMP
- ...1..... BSS does Allow use of DSSS/CCK Rates @40MHz
- ....1..... Maximal A-MSDU size: 7935 bytes
- .....0.. Does Not Support HT-Delayed BlockAck Operation
- .....00..... No Rx STBC Support
- .....0..... Transmitter does Not Support Tx STBC
- ......1..... Short GI for 40 MHz: Supported
- ......1..... Short GI for 20 MHz: Supported
- ......0.... Device is Not Able to Receive PPDU with GF Preamble
- ......11.. Spatial Multiplexing Enabled
- ......1. Both 20MHz and 40MHz Operation is Supported
- ......0 LDPC coding capability: Not Supported

**A-MPDU Parameters:** %00011011

- xxx..... Reserved
- ...110.. Minimum MPDU Start Spacing: 8 usec
- .....11 Maximum Rx A-MPDU Size: 64K

**Supported MCS Set**

**One Spatial Stream:** %11111111

- MCS Index 0 Supported - BPSK. Coding Rate: 1/2
- MCS Index 1 Supported - QPSK. Coding Rate: 1/2
- MCS Index 2 Supported - QPSK. Coding Rate: 3/4
- MCS Index 3 Supported - 16 QAM. Coding Rate: 1/2
- MCS Index 4 Supported - 16 QAM. Coding Rate: 3/4
- MCS Index 5 Supported - 64 QAM. Coding Rate: 2/3
- MCS Index 6 Supported - 64 QAM. Coding Rate: 3/4
- MCS Index 7 Supported - 64 QAM. Coding Rate: 5/6

**Two Spatial Streams:** %01111111

- MCS Index 8 Supported - BPSK. Coding Rate: 1/2
- MCS Index 9 Supported - QPSK. Coding Rate: 1/2
- MCS Index 10 Supported - QPSK. Coding Rate: 3/4
- MCS Index 11 Supported - 16 QAM. Coding Rate: 1/2
- MCS Index 12 Supported - 16 QAM. Coding Rate: 3/4
- MCS Index 13 Supported - 64 QAM. Coding Rate: 2/3
- MCS Index 14 Supported - 64 QAM. Coding Rate: 3/4
- MCS Index 15 Not Supported - 64 QAM. Coding Rate: 5/6

**Rx Bitmask b16-b23:** %00000000

**Rx Bitmask b24-b31:** %00000000

**Rx Bitmask b32-b39:** %00000000

**Rx Bitmask b40-b47:** %00000000

**Rx Bitmask b48-b55:** %00000000



Capacités annoncées dans des balises :

```

Rx Bitmask b64-b76: %0000000000000000
Reserved: %000
Highest Supported Rate:0 Mbps
Reserved: %0000000
Tx Supported MCS Set: %0 Not Defined
Tx and Rx MCS Set: %0 Equal
Tx Maximum Number Spatial Streams Supported:%00 1 Spatial Stream
Tx Unequal Modulation:%0 Not Supported
Reserved: %00000000000000000000000000000000000000 b101-b127

HT Extended Capabilities Info:%00000000000000000000
XXXX .... . Reserved
.... 0... . Reverse Direction Responder: Supported
.... .0.. . +HTC Support: Supported
.... ..00 . . MCS Feedback: STA Does Not Provide MCS Feedback
.... .XXX X.. . Reserved
.... . . . . .00. Transition Time: No Transition
.... . . . . .0 Transmitter Supports PCO: Supported

Tx Beam Forming Capability (TxBF):%00000000000000000000000000000000000000
xxx. .... . Reserved
...0 0... . . Channel Estimation Capability: 1 Space Time Stream
... .00. . . . . CSI Max Number of Rows: 1 Row of CSI
... ..0 0... . . . . Compressed BF Feedback Matrix: 1 TX Antenna Sounding
... . . . .00. . . . . Uncompressed BF Feedback Matrix: 1 TX Antenna Sounding
... . . . .0 0... . . . . CSI Number of BF Antennas: 1 TX Antenna Sounding
... . . . . .00. . . . . Minimal Grouping: STA Supports Groups of 1 (No Grouping)
... . . . . .0 0... . . . . Compressed BF Feedback Matrix: Not Supported
... . . . . .00. . . . . Uncompressed BF Feedback Matrix: Not Supported
... . . . . .0 0... . . . . TxBF CSI Feedback: Not Supported
... . . . . .0.. . . . . Compressed BF Feedback Matrix Capable: Not Supported
... . . . . .0. . . . . Uncompressed BF Feedback Matrix: Not Supported
... . . . . .0 .... . . . . Explicit CSI TxBF Capable: Not Supported
... . . . . .00.. . . . . Calibration: Not Supported
... . . . . .0. .... . . . . Implicit TxBF Capable: Not Supported
... . . . . .0 .... . . . . Tx NDP Capable: Not Supported
... . . . . .0... . . . . Rx NDP Capable: Not Supported
... . . . . .0.. . . . . Tx Staggered Sounding Capable: Not Supported
... . . . . .0. . . . . Rx Staggered Sounding Capable: Not Supported
... . . . . .0 Implicit TxBF Receiving Capable: Not Supported

Antenna Selection Capability (ASEL):%00000000
x... . . . . Reserved
..0.. . . . . Tx Sounding PPDUs Capable: Not Supported
..0. . . . . Rx ASEL Capable: Not Supported
...0 . . . . . Antenna Indices Feedback Capable: Not Supported
.... 0... . . . . Explicit CSI Feedback: Tx AS Capable: Not Supported
.... .0.. . . . . Antenna Indices Feedback Based Tx ASEL Capable: Not Supported
.... ..0. . . . . Re-Explicit CSI Feedback Tx ASEL Capable: Not Supported

```

Capacités annoncées dans des balises :

```

① Element ID: 61 Additional HT Information
① Length: 22
① Primary Channel: 6
① Srvc Int Granularity: 4000 5ms
① PSMP STAs Only: 40 Association Requests are Accepted Regardless of PSMP Capability
① RIFS Mode: 41 Use of RIFS Permitted
① STA Channel Width: 41 Use Any Channel Width Enabled Under Supported Channel Width Set
① 2nd Channel Offset: 401 Above the Primary Channel
① HT Info Element 2: 40000000000000100
①
①          xxxxxxxx xxx..... Reserved
①          ..... 0.... OBSS Non-HT STAs: Use of Protection for Non-HT STAs Not Needed
①          ..... 0.... Transmit Burst Limit: No Limit
①          ..... 1.. Non-Greenfield STAs: One or more HT STAs are Not Greenfield Capable
①          ..... 00 Operating Mode: Pure HT (No Protection) - All STAs in the BSS are 20/40 MHz HT
① HT Info Element 3: 40000000000000000
①
①          xxxx..... Reserved
①          ..... 0.... PCO Phase: Switch To/Continue Use 20MHz Phase
①          ..... 0.. PCO Active: Not Active in the BSS
①          ..... 0. L-SIG TNDP Protection: Not Full Support
①          ..... 0 Secondary Beacon: Primary Beacon
①          ..... 0..... Dual CTS Protection: Not Required
①          ..... 0..... Dual Beacon: No Secondary Beacon Transmitted
①          ..... .xxxxx Reserved
① Basic MCS Set
① One Spatial Stream: 400000000
①
① MCS Index 0 Not Supported - BPSK, Coding Rate: 1/2
① MCS Index 1 Not Supported - QPSK, Coding Rate: 1/2
① MCS Index 2 Not Supported - QPSK, Coding Rate: 3/4
① MCS Index 3 Not Supported - 16 QAM, Coding Rate: 1/2
① MCS Index 4 Not Supported - 16 QAM, Coding Rate: 3/4
① MCS Index 5 Not Supported - 64 QAM, Coding Rate: 2/3
① MCS Index 6 Not Supported - 64 QAM, Coding Rate: 3/4
① MCS Index 7 Not Supported - 64 QAM, Coding Rate: 5/6
① Two Spatial Streams: 400000000
①
① MCS Index 8 Not Supported - BPSK, Coding Rate: 1/2
① MCS Index 9 Not Supported - QPSK, Coding Rate: 1/2
① MCS Index 10 Not Supported - QPSK, Coding Rate: 3/4
① MCS Index 11 Not Supported - 16 QAM, Coding Rate: 1/2
① MCS Index 12 Not Supported - 16 QAM, Coding Rate: 3/4
① MCS Index 13 Not Supported - 64 QAM, Coding Rate: 2/3
① MCS Index 14 Not Supported - 64 QAM, Coding Rate: 3/4
① MCS Index 15 Not Supported - 64 QAM, Coding Rate: 5/6
① Rx Bitmask b16-b23: 400000000
① Rx Bitmask b24-b31: 400000000
① Rx Bitmask b32-b39: 400000000
① Rx Bitmask b40-b47: 400000000

```

L'association semble avec l'ajout du bloc ACK a installé pour A-MPDU :

194	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	6.0	14
195	00:17:DF:A6:4C:90	Ethernet Broadcast	802.11 Beacon	00:17:DF:A6:4C:90	*	100%	6.0	204
196	00:13:E8:1D:F0:55	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	81
197	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Probe Rsp	00:17:DF:A6:4C:90	*+	100%	6.0	204
198	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	6.0	14
199	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	87
200	00:13:E8:36:19:77	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	81
201	00:17:DF:A6:4C:90	00:13:E8:36:19:77	802.11 Probe Rsp	00:17:DF:A6:4C:90	*+	100%	6.0	204
202	00:13:E8:36:19:77	00:17:DF:A6:4C:90	802.11 Ack		#	100%	6.0	14
203	00:13:E8:36:19:77	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	74
204	00:13:E8:36:19:77	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	81
205	00:17:DF:A6:4C:90	00:13:E8:36:19:77	802.11 Probe Rsp	00:17:DF:A6:4C:90	*+	100%	6.0	204
206	00:13:E8:36:19:77	00:17:DF:A6:4C:90	802.11 Ack		#	100%	6.0	14
207	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	52%	1.0	55
208	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	97%	1.0	55
209	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	87
210	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	55
211	00:17:DF:A6:4C:90	Ethernet Broadcast	802.11 Beacon	00:17:DF:A6:4C:90	*	100%	6.0	204
212	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	95%	1.0	55
213	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	87
214	00:13:CE:89:DC:A2	Ethernet Broadcast	802.11 Probe Req	Ethernet Broadcast	*	100%	1.0	55
215	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Auth	00:17:DF:A6:4C:90	*	100%	36.0	34
216	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Ack		#	100%	36.0	14
217	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Auth	00:17:DF:A6:4C:90	*	100%	36.0	34
218	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	36.0	14
219	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Assoc Req	00:17:DF:A6:4C:90	*	100%	36.0	134
220	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Ack		#	100%	36.0	14
221	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Assoc Rsp	00:17:DF:A6:4C:90	*	100%	130.0	180
222	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	36.0	14
223	192.168.170.89	224.0.0.1	IGMP	00:17:DF:A6:4C:90		100%	130.0	84
224	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	36.0	14
225	192.168.170.89	224.0.0.1	IGMP	00:17:DF:A6:4C:90	+	100%	130.0	84
226	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	36.0	14
227	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	WLCPP	00:17:DF:A6:4C:90		100%	130.0	92
228	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	36.0	14
229	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Action	00:17:DF:A6:4C:90	*	100%	130.0	37
230	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Ack		#	100%	36.0	14
231	00:13:E8:1D:F0:55	00:17:DF:A6:4C:90	802.11 Action	00:17:DF:A6:4C:90	*	100%	36.0	37
232	00:17:DF:A6:4C:90	00:13:E8:1D:F0:55	802.11 Ack		#	100%	36.0	14

## Verifying A-MPDU is enabled on the controller

The image shows a Wireshark packet capture of an 802.11 Beacon frame. The 'HT Capability Info' section is expanded, showing the following details:

- Element ID: 45 HT Capability Info [63]
- Length: 26 [64]
- HT Capability Info: 0000100001101110 [65-96]
  - 0..... 1-STS TXOP Protection Support: Not Supported
  - ..0..... AP allows use of 4096u Transmissions In Neighboring BSSs
  - ...0..... Device/BSS does Not Support use of TXOP
  - ....2..... BSS does Allow use of 802.11e Inter-Frame Spacing (IFS)
  - .....1..... Maximal A-MPDU size: 7935 bytes
  - .....0..... Does Not Support HT-Delayed BlockAck Operation
  - .....0..... No Rx STBC Support
  - .....0..... Transmitter does Not Support Tx STBC
  - .....1..... Short GI for 40 MHz: Supported
  - .....1..... Short GI for 20 MHz: Supported
  - .....0..... Device is Not Able to Receive TXOPs with GI Freeable
  - .....11... Spatial Multiplexing Enabled
  - .....1..... Both 20MHz and 40MHz Operation is Supported
  - .....0..... LDPC coding capability: Not Supported
- A-MPDU Parameters: 00001011 [97]
  - ...0..... Reserved [07 Back 0x00]
  - ...110... Minimum MPDU Start Spacing: 2 used [07 Back 0x1C]
  - .....11 Maximum Rx A-MPDU Size: 64K [07 Back 0x03]
- Supported MCS Set

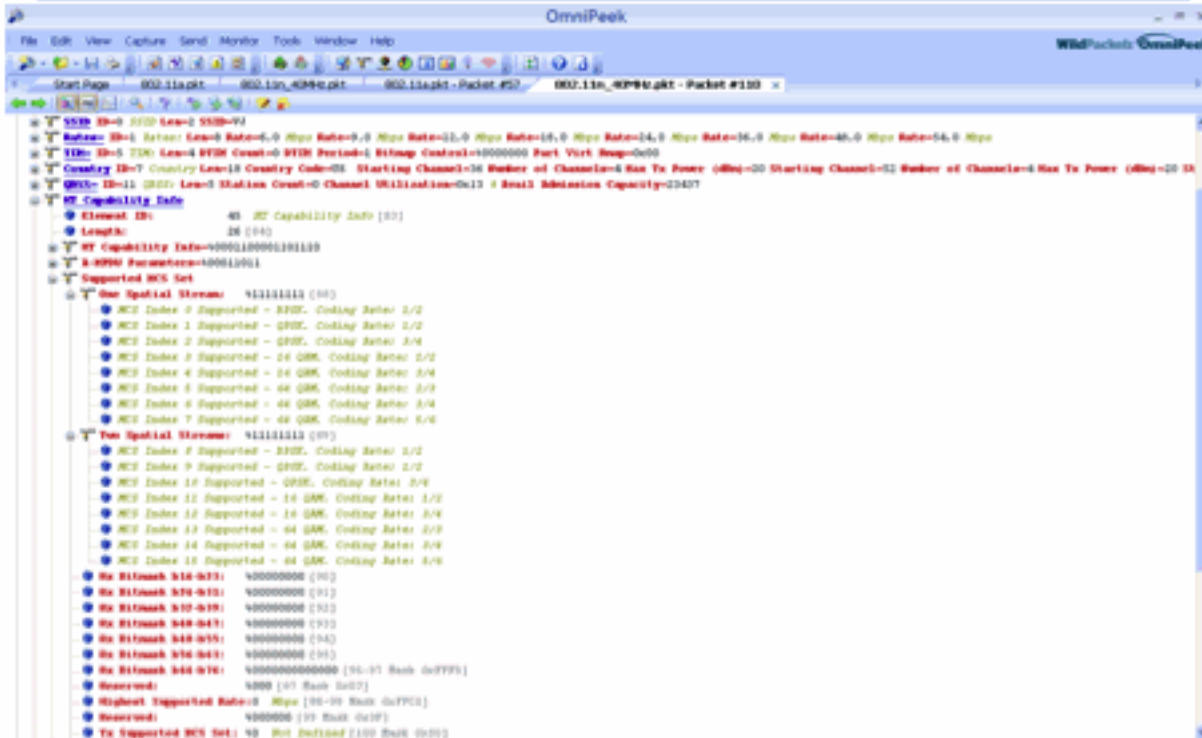
An arrow points from the 'A-MPDU Parameters' section to the text: "A-MPDU enabled and seen in the beacon".

Above is a beacon frame from an SSID enabled for n rates

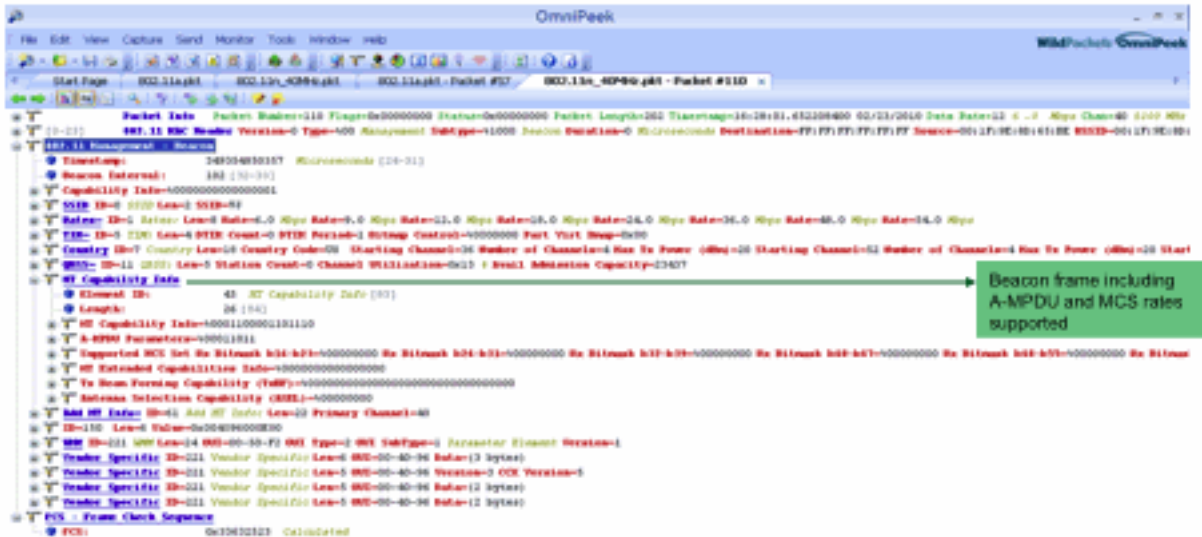




# Supported MCS rates



# 802.11a with N rates Enabled



# 802.11A Beacon frame

```
Packet Info Packet Number: 57 Flags: 0x00000000 Status: 0x00000000 Packet Length: 150 Timestamp: 17:29:12.36369900 01/21/2010 Data Rate: 12.0 Mbps Chan: 36 SSID: 802.11 Beacon Version: 0 Type: 400 Management SubType: 41000 Beacon Duration: 0 Microseconds Destination: FF:FF:FF:FF:FF:FF Source: 00:14:97:8A:84:8E BSSID: 00:14:97:8A:84:8E

802.11 Management - Beacon
  Timestamp: 37048868 Microseconds [10-11]
  Beacon Interval: 200 [10-11]
  Capability Info: 0000000000000000
  SSI: ID=0 SSID Len=2 SSID=FF
  Rates: ID=1 Rates Len=8 Rate=6.0 Mbps Rate=9.0 Mbps Rate=12.0 Mbps Rate=18.0 Mbps Rate=24.0 Mbps Rate=36.0 Mbps Rate=48.0 Mbps Rate=54.0 Mbps
  TIM: ID=5 TIM Len=4 TIM Count=0 TIM Period=1 Bitmap Control=00000000 Part Virt Smp=0x00
  Country ID=7 Country Len=18 Country Code=00 Starting Channel=36 Number of Channels=4 Max Tx Power (dBm)=20 Starting Channel=32 Number of Channels=4 Max Tx Power (dBm)=20 Start
  QoS: ID=11 QoS Len=5 Station Count=0 Channel Utilization=0x10 / 2048 Admission Capacity=2047
  ID=150 Len=6 Value=0x00409600P00
  MIM: ID=221 MIM Len=24 MIC=00-50-F2 MIC Type=2 MIC SubType=1 Parameter Element Version=1
  Vendor Specific ID=221 Vendor Specific Len=4 00-00-40-94 Data=(3 bytes)
  Vendor Specific ID=221 Vendor Specific Len=4 00-00-40-94 Version=0 CCX Version=1
  Vendor Specific ID=221 Vendor Specific Len=4 00-00-40-94 Data=(2 bytes)
  Vendor Specific ID=221 Vendor Specific Len=4 00-00-40-94 Data=(2 bytes)
  FCS - Frame Check Sequence
  FCS: 0x51420932 Calculated
```

## Informations connexes

- [Support et documentation techniques - Cisco Systems](#)