
ARUBA ACCESS POINTS

DHCPv4 GUIDE

REVISION 1



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Options Implementation

Vendor Class Identifier

All Aruba Access Points implement the DHCP option 60 vendor class identifier (RFC 2132) that forwards a specific string to the DHCP server in discovery and request packets. The string value that is forwarded to the DHCP server is dependent on the Aruba Access Points mode (Table 1.0):

Type	Vendor Class Identifier
Instant	ArubaInstantAP
Campus	ArubaAP
Unified	ArubaInstantAP

Table 1.0 – Vendor Class Identifiers

A DHCP server can be configured to filter on received option 60 string values and forward standard or vendor specific options in DHCP offer and acknowledgement packets. An example of this is provided in the [ISC DHCP Server](#) configuration example further in this document. Filtering using option 60 allows different types of devices that require vendor-specific information to co-exist in a common broadcast domain. For example two vendors Access Points sharing a DHCP scope that each require specific option 43 values to be supplied for Controller discovery.

Aruba Access Points also requires specific option 60 values to be returned in DHCP offer and acknowledgement packets for vendor specific information to be considered. The expected option 60 value being dependent on the mode of the Access Points. If the expected option 60 value is not present in the DHCP offer or acknowledgement packet, any supplied vendor specific information is ignored.

Vendor-Specific Information

Aruba Access Points support vendor-specific information that can be provided in offer and acknowledgement packets. The type of vendor-specific information that is supported by an Aruba Access Point is dependent on the mode. For example Instant mode Access Points can be supplied with HTTP Proxy Server and/or AirWave Server information while Campus mode or Unified Access Points can be supplied Mobility Controller information.

Aruba currently implements two option codes. Option 43 is implemented to supply Mobility Controller and AirWave Server information while option 148 is implemented to supply HTTP Proxy Server information. Examples, usage and syntax for each vendor-specific option is provided in each respective section.

As previously mentioned, for an Aruba Access Point to implement the supplied vendor-specific information, the correct option 60 string value must be returned. If the correct option 60 value is not present in the DHCP offer and acknowledgement with the vendor-specific information, the Aruba Access Point will ignore it.

Client Details

All Aruba Access Points implement a DHCP client as a means of dynamically obtaining IPv4 addressing along with other network configuration parameters. The information provided by a DHCP server is used by Aruba Access Points to provide the necessary information required to communicate over an intermediate IPv4 network, influence the Access Points mode as well as provide Mobility Controller or AirWave Server information.

Instant Mode Access Points

This section provides details for the standard and Aruba vendor-specific options supported by Aruba Access Points operating in Instant mode. Information is provided for the DHCP options supplied by Access Points to the DHCP server in discovery and request packets as well as the DHCP options that can be supplied to the Access Points in offer and request packets.

Standard Forwarded Options

Table 2.0 lists the standard options that are supplied by Instant-based Access Points to a DHCP server in discovery and request packets. The values for these options can be used by the DHCP server to assign a specific host address (i.e. static reservations) or filter and supply specific return options:

Code	Description	RFC	Notes / Example
61	Client Identifier	RFC 2132	The base MAC address of the Access Point. Example: 9c:8c:d8:ca:83:20
60	Vendor Class Identifier	RFC 2132	The option 60 value sent by Instant-based Access Points: Example: ArubaInstantAP

Table 2.0 – Forwarded Options

Table 2.1 lists the standard and vendor-specific DHCP options that are requested by Instant-based Access Points in discovery and request packets. The requested options tell the DHCP server which options are supported and can be returned to the Access Points:

Code	Description	RFC	Requested Options
55	Parameter Request List	RFC 2132	1 (Subnet Mask) 3 (Router) 6 (Domain Name Server) 12 (Host Name) 15 (Domain Name) 42 (Network Time Protocol) 43 (Vendor-Specific Information) 60 (Vendor Class Identifier) 148 (Proxy Server Information)

Table 2.1 – Requested Options

Standard Return Options

Table 2.2 lists the standard DHCP options and examples that can be returned to Instant-based Access Points from a DHCP server in offer and acknowledgement packets:

Code	Description	Format	Notes / Example
1	Subnet Mask	IP Address	The subnet mask assigned by the DHCP server. Example: 255.255.255.0
3	Router	IP Address	The default gateway assigned by the DHCP server. Example: 192.0.2.1
6	Domain Name Server	IP Address	A list of DNS servers assigned by the DHCP server (in order of preference). Example: 192.0.2.2
15	Domain Name	String	The domain name assigned by the DHCP server. Example: arubanetworks.local
42	Network Time Protocol Servers	String	IP addresses or FQDNs of one or more NTP servers. Note this will override the default pool.ntp.org servers. Example: ntp.arubanetworks.local

Table 2.2 – Standard Return Options

Vendor-Specific Return Options

Airwave Server Discovery

Table 2.3 lists the Aruba vendor-specific options, formatting and examples that can be returned to Instant-based Access Points to perform AirWave Server discovery. Note that the option 60 value **ArubaInstantAP** must be returned or the option 43 value will be ignored. Please refer to the AirWave User Guide for more details:

Code	Description	Format	Use / Example
43	Vendor-Specific Information	String	AirWave Servers Group, Folder, IP/FQDN and Shared Key. Format: Group:Top-Folder:Sub-Folder,[IP/FQDN],[Key] Example: IAPs:Branch1,192.0.2.20,Aruba123
60	Vendor Class Identifier	String	Must be supplied with option 43: Mandatory Value: ArubaInstantAP

Table 2.3 – AirWave Server Discovery

HTTP Proxy

Starting with Instant 8.4.0.0, Instant-based Access Points can be supplied with HTTP proxy configuration to permit Zero Touch Provisioning (ZTP) through a HTTP proxy server using DHCP option 148. This DHCP option can be supplied to Instant-based Access Points if Activate, AirWave or Central is reachable through a HTTP proxy server. Instant 8.5.0.0 provides an additional enhancement by adding support for username and password.

Table 2.4 lists the DHCP vendor specific options, formatting and examples to permit ZTP through a HTTP proxy server. Note that the option 60 value **ArubaInstantAP** must be returned or the option 148 value will be ignored:

Code	Description	Format	Use / Example
148	Proxy Server Information (8.4.0.0)	String	HTTP proxy server IP/FQDN and Port: Format: server=[IP/FQDN],port=[Port] Example: server=192.0.2.30,port=8080
148	Proxy Server Information (8.5.0.0)	String	HTTP proxy server IP/FQDN, Port, Username and Password: Format: server=[IP/FQDN],port=[Port],username=[Value],password=[Value] Example: server=192.0.2.30,port=8080,username=iap1,password=aruba123
60	Vendor Class Identifier	String	Must be supplied with option 148: Mandatory Value: ArubaInstantAP

Table 2.4 – HTTP Proxy Server



Please note that both the username and password are forwarded to Instant mode Access Points in offers and acknowledgements in clear text.



The HTTP Proxy option can be used with Instant mode Access Points that are managed by AirWave or Central. When managed by AirWave, the HTTP Proxy option can be combined with the [AirWave Server Discovery](#) option.

Campus Mode Access Points

This section provides details for the standard and Aruba vendor-specific options supported by Aruba Access Points operating in Campus mode terminating on Mobility Controllers. Information is provided for the DHCP options supplied by Access Points to the DHCP server in discovery and request packets as well as the DHCP options that can be supplied to the Access Points in offer and request packets.

Standard Forwarded Options

Table 3.0 lists the standard options that are supplied by Campus-based Access Points to a DHCP server in discovery and request packets. The values for these options can be used by the DHCP server to assign a specific host address (i.e. static reservations) or filter and supply specific return options:

Code	Description	RFC	Sent Option Value
61	Client Identifier	RFC 2132	The base MAC address of the Aruba Instant Access Point. Example: 9c:8c:d8:ca:83:20
60	Vendor Class Identifier	RFC 2132	The option 60 value sent by Campus-based Access Points: Example: ArubaAP

Table 3.0 – Forwarded Options

Table 3.1 lists the standard and vendor-specific DHCP options that are requested by Campus-based Access Points in discovery and request packets. The requested options tells the DHCP server which options are supported and can be returned to the Access Points:

Code	Description	RFC	Requested Options
55	Parameter Request List	RFC 2132	1 (Subnet Mask) 3 (Router) 6 (Domain Name Server) 12 (Host Name) 15 (Domain Name) 42 (Network Time Protocol) 43 (Vendor-Specific Information) 60 (Vendor Class Identifier)

Table 3.1 – Requested Options

Standard Return Options

Table 3.2 lists the standard DHCP options and examples that can be returned to Campus-based Access Points from a DHCP server in offer and acknowledgement packets:

Code	Description	Format	Notes / Example
1	Subnet Mask	IP Address	The subnet mask assigned by the DHCP server. Example: 255.255.255.0
3	Router	IP Address	The default gateway assigned by the DHCP server. Example: 192.0.2.1
6	Domain Name Server	IP Address	A list of DNS servers assigned by the DHCP server (in order of preference). Example: 192.0.2.2
15	Domain Name	String	The domain name assigned by the DHCP server. Example: arubanetworks.local

Table 3.2 – Standard Return Options

Vendor-Specific Return Options

Mobility Controller Discovery

Table 3.3 lists the Aruba vendor-specific DHCP options, formatting and examples that can be returned to Campus-based Access Points to discover a Mobility Controller or Cluster. Note that the option 60 value **ArubaAP** must be returned or the option 43 value will be ignored:

Code	Description	Format	Use / Example
43	Vendor-Specific Information	String	Mobility Controller / Cluster IP Address. Example: 192.0.2.15
60	Vendor Class Identifier	String	Must be supplied with option 43: Mandatory Value: ArubaAP

Table 3.3 – Mobility Controller / Cluster IP

Unified Access Points

This section provides details for the Aruba vendor-specific options supported by Aruba Unified Access Points using the factory defaulted configuration. Unlike Access Points purchased as Instant or Campus models, Unified Access Points are either shipped with a special manufacturing image (early units) to facilitate the discovery process to become either an Instant mode or Campus mode Access Point or the full Instant image.

Unified Access Points follow a specific discovery process to connect to a controller-based or controller-less network. With Unified Access Points, Aruba has not introduced a new operating mode – but rather a new way for Aruba Access Points to auto-discovery their operating mode. Figure 1.0 provides a flow for this discovery process.

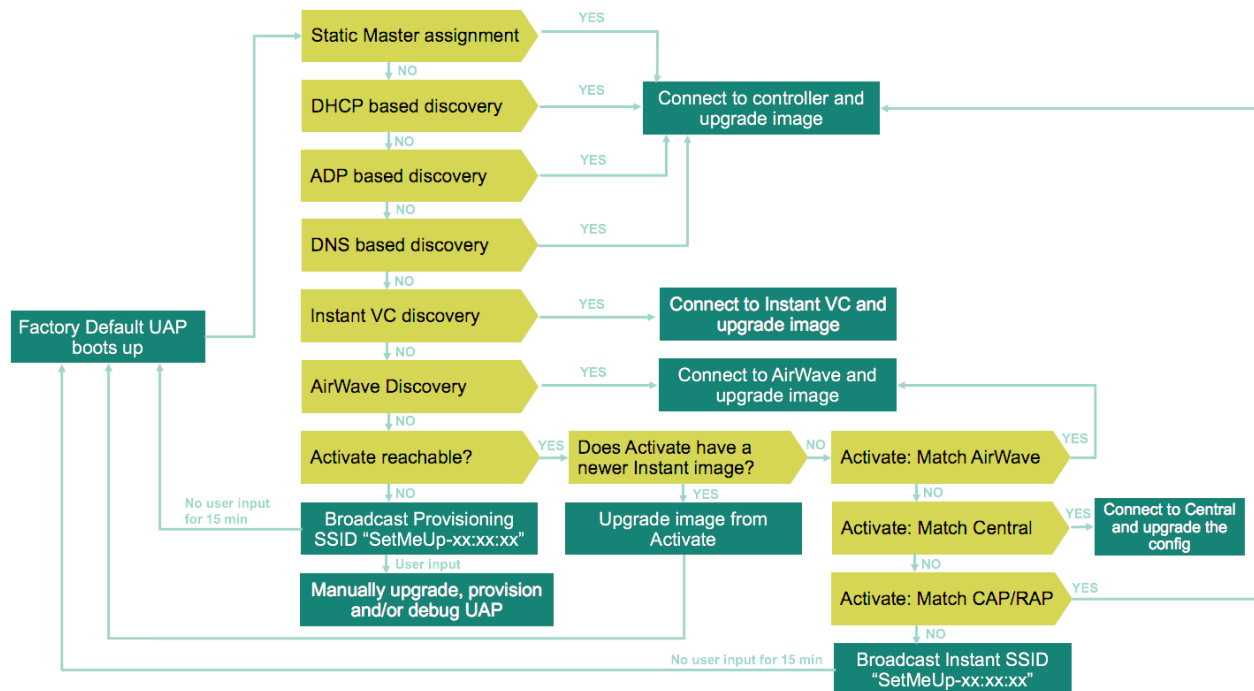


Figure 1.0 – Unified Access Point Discovery Process

When a Unified Access Point first initializes, it behaves in the same way as an Aruba Access Point operating in Instant mode. The standard and vendor-specific DHCP options that are supported mirror what has been captured in the [Instant Mode Access Points](#) section. Likewise if a Unified Access Point has been converted into Campus mode, the standard and vendor-specific DHCP options that are supported mirror what has been captured in the [Campus Mode Access Points](#) section. The operating mode determines the DHCP options that are supported.

One discovery enhancement for Unified Access Point is that vendor-specific DHCP options can be leveraged to convert the Unified Access Points into Campus mode. Unlike Access Points operating in Instant mode, vendor-specific options can be supplied to the Unified Access Point to initiate Mobility Controller discovery and the Campus mode conversion.

Campus Mode Conversion

Table 4.0 lists the Aruba vendor-specific DHCP options, formatting and examples that can be returned to a Unified Access Point to initiate Mobility Controller discovery and the Campus mode conversion. Note that the option 60 value **ArubaAP** must be returned or the option 43 value will be ignored:

Code	Description	Format	Use / Example
43	Vendor-Specific Information	String	Mobility Controller / Cluster IPv4 Address. Example: 192.0.2.15
60	Vendor Class Identifier	String	Must be supplied with option 43: Mandatory Value: ArubaAP

Table 4.0 – Unified Access Point Campus Mode Conversion



Please note that if the option 60 value **ArubaInstantAP** is returned, the Unified Access Point will follow the Instant mode discovery process.

Server Configuration Examples

This section provides contextual DHCP server configuration examples for how to correctly configure Aruba vendor-specific return options on Aruba AOS-S Switches, Aruba AOS-8 Mobility Controllers, Cisco IOS/IOS-XE Routers or Switches, Linux ISC and Microsoft Windows Server.

Aruba AOS-8 Mobility Controllers

Campus Mode Access Points

Mobility Controller Discovery Example

DHCP Scope Example

```
!  
ip dhcp pool vlan77  
    domain-name arubanetworks.local  
    dns-server 192.168.10.5 192.168.10.6  
    default-router 192.168.77.1  
    network 192.168.77.0 255.255.255.0  
    option 60 text ArubaAP  
    option 43 ip 192.168.72.15  
!
```

Unified Access Points

Campus Conversion Example

DHCP Scope Example

```
!  
ip dhcp pool vlan77  
    domain-name arubanetworks.local  
    dns-server 192.168.10.5 192.168.10.6  
    default-router 192.168.77.1  
    network 192.168.77.0 255.255.255.0  
    option 60 text ArubaAP  
    option 43 ip 192.168.72.15  
!
```

Aruba AOS-S Switches

Instant Mode Access Points66.AirWave Discovery Example

DHCP Scope Example

```
dhcp-server pool "vlan77"  
  default-router "192.168.77.1"  
  dns-server "192.168.10.5,192.168.10.6"  
  domain-name "arubanetworks.local"  
  network 192.168.77.0 255.255.255.0  
  option 43 ascii "IAPs:Branch1,192.168.66.20,Aruba123"  
  option 60 ascii "ArubaInstantAP"  
  range 192.168.77.100 192.168.77.200  
  exit
```

HTTP Proxy Example

DHCP Scope Example

```
dhcp-server pool "vlan77"  
  default-router "192.168.77.1"  
  dns-server "192.168.10.5,192.168.10.6"  
  domain-name "arubanetworks.local"  
  network 192.168.77.0 255.255.255.0  
  option 148 ascii "server=192.168.66.30,port=8080,username=iapl,password=aruba123"  
  option 60 ascii "ArubaInstantAP"  
  range 192.168.77.100 192.168.77.200  
  exit
```

Campus Mode Access Points

Mobility Controller Discovery Example

DHCP Scope Example

```
dhcp-server pool "vlan77"  
  default-router "192.168.77.1"  
  dns-server "192.168.10.5,192.168.10.6"  
  domain-name "arubanetworks.local"  
  network 192.168.77.0 255.255.255.0  
  option 43 ip "192.168.72.15"  
  option 60 ascii "ArubaAP"  
  range 192.168.77.100 192.168.77.200  
  exit
```

Unified Access Points

Campus Conversion Example

DHCP Scope Example

```
dhcp-server pool "vlan77"  
  default-router "192.168.77.1"  
  dns-server "192.168.10.5,192.168.10.6"  
  domain-name "arubanetworks.local"  
  network 192.168.77.0 255.255.255.0  
  option 43 ip "192.168.72.15"  
  option 60 ascii "ArubaAP"  
  range 192.168.77.100 192.168.77.200  
  exit
```

Cisco IOS/IOS-XE Routers or Switches

Instant Mode Access Points

AirWave Discovery Example

DHCP Scope Example

```
!  
ip dhcp pool vlan77  
  network 192.168.77.0 255.255.255.0  
  dns-server 192.168.10.5 192.168.10.6  
  domain-name arubanetworks.local  
  default-router 192.168.77.1  
  option 60 ascii ArubaInstantAP  
  option 43 ascii IAPs:Branch1,192.168.66.20,Aruba123  
!
```

HTTP Proxy Example

DHCP Scope Example

```
!  
ip dhcp pool vlan77  
  network 192.168.77.0 255.255.255.0  
  dns-server 192.168.10.5 192.168.10.6  
  domain-name arubanetworks.local  
  default-router 192.168.77.1  
  option 60 ascii ArubaInstantAP  
  option 148 ascii server=192.168.66.30,port=8080,username=iap1,password=aruba123  
!
```

Campus Mode Access Points

Mobility Controller Discovery Example

DHCP Scope Example

```
!  
ip dhcp pool vlan77  
  network 192.168.77.0 255.255.255.0  
  dns-server 192.168.10.5 192.168.10.6  
  domain-name arubanetworks.local  
  default-router 192.168.77.1  
  option 60 ascii ArubaAP  
  option 43 ip 192.168.72.15  
!
```

Unified Access Points

Campus Mode Conversion Example

DHCP Scope Example

```
!  
ip dhcp pool vlan77  
  network 192.168.77.0 255.255.255.0  
  dns-server 192.168.10.5 192.168.10.6  
  domain-name arubanetworks.local  
  default-router 192.168.77.1  
  option 60 ascii ArubaAP  
  option 43 ip 192.168.72.15  
!
```

ISC DHCP Server

Instant Mode Access Points

AirWave Discovery Example

DHCP Scope Example 1 – Standard Return Options

```
# Global Options
option amp-server code 43 = text;

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "arubanetworks.local";
    option vendor-class-identifier "ArubaInstantAP";
    option amp-server "IAPs:Branch1,192.168.66.20,Aruba123";
    pool {
        range 192.168.77.100 192.168.77.250;
    }
}
```

DHCP Scope Example 2 – Return Options by Vendor-Class

```
# Global Options
option amp-server code 43 = text;
class "vendor-class" {
    match option vendor-class-identifier;
}

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "lab.marshalls.local";
    pool {
        failover peer "failover-partner";
        range 192.168.77.100 192.168.77.250;
    }
    subclass "vendor-class" "ArubaInstantAP" {
        option vendor-class-identifier "ArubaInstantAP";
        option amp-server "IAPs:Branch1,192.168.66.20,Aruba123";
    }
}
```

HTTP Proxy Example

DHCP Scope Example 1 – Standard Return Options

```
# Global Options
option iap-proxy code 148 = text;

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "arubanetworks.local";
    option vendor-class-identifier "ArubaInstantAP";
    option iap-proxy "server=192.168.66.30,port=8080,username=iap1,password=aruba123";
    pool {
        range 192.168.77.100 192.168.77.250;
    }
}
```

DHCP Scope Example 2 – Return Options by Vendor-Class

```
# Global Options
option iap-proxy code 148 = text;
class "vendor-class" {
    match option vendor-class-identifier;
}

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "lab.marshalls.local";
    pool {
        failover peer "failover-partner";
        range 192.168.77.100 192.168.77.250;
    }
    subclass "vendor-class" "ArubaInstantAP" {
        option vendor-class-identifier "ArubaInstantAP";
        option iap-proxy "server=192.168.66.30,port=8080,username=iap1,password=aruba123";
    }
}
```


Campus Mode Access Points

Mobility Controller Discovery Example

DHCP Scope Example 1 – Standard Return Options

```
# Global Options
option masterip code 43 = ip-address;

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "arubanetworks.local";
    option vendor-class-identifier "ArubaAP";
    option masterip 192.168.72.15;
    pool {
        range 192.168.77.100 192.168.77.250;
    }
}
```

DHCP Scope Example 2 – Return Options by Vendor-Class

```
# Global Options
option masterip code 43 = ip-address;
class "vendor-class" {
    match option vendor-class-identifier;
}

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "lab.marshalls.local";
    pool {
        failover peer "failover-partner";
        range 192.168.77.100 192.168.77.250;
    }
    subclass "vendor-class" "ArubaAP" {
        option vendor-class-identifier "ArubaAP";
        option masterip 192.168.72.15;
    }
}
```

Unified Access Points

Campus Mode Conversion Example

DHCP Scope Example 1 – Standard Return Options

```
# Global Options
option masterip code 43 = ip-address;

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "arubanetworks.local";
    option vendor-class-identifier "ArubaAP";
    option masterip 192.168.72.15;
    pool {
        range 192.168.77.100 192.168.77.250;
    }
}
```

DHCP Scope Example 2 – Return Options by Vendor-Class

```
# Global Options
option masterip code 43 = ip-address;
class "vendor-class" {
    match option vendor-class-identifier;
}

# Scope Example
subnet 192.168.77.0 netmask 255.255.255.0 {
    option routers 192.168.77.1;
    option domain-name "lab.marshalls.local";
    pool {
        failover peer "failover-partner";
        range 192.168.77.100 192.168.77.250;
    }
    subclass "vendor-class" "ArubaInstantAP" {
        option vendor-class-identifier "ArubaAP";
        option masterip 192.168.72.15;
    }
    subclass "vendor-class" "ArubaAP" {
        option vendor-class-identifier "ArubaAP";
        option masterip 192.168.72.15;
    }
}
```



Note that in the second example, two subclasses have been defined. The first subclass matches on the option 60 value *ArubaInstantAP* and is defined to initiate the conversion of the Unified Access Points. Remember by default Unified Access Points in a factory defaulted state will send the option 60 value *ArubaInstantAP*. The second subclass matches on the option 60 value *ArubaAP* and is defined to support deployments of legacy Access Points operating in Campus mode.

Microsoft DHCP Server

The examples below demonstrate how to configure Aruba vendor-specific return options as standard options within a DHCP scope. Due to the differences on how Microsoft encapsulates pre-defined options when filtering on vendor-classes, it is not currently possible to filter on an Aruba option 60 value and return vendor-specific options to Aruba Access Points. The returned encapsulated values include type-length-value (TLV) blocks which cannot be deciphered by an Aruba Access Point.

Instant Mode Access Points

AirWave Discovery Example

DHCP Scope Example

Option Name	Vendor	Value
003 Router	Standard	192.168.77.1
006 DNS Servers	Standard	192.168.66.3
015 DNS Domain Name	Standard	lab.marshalls.local
043 Vendor Specific Info	Standard	49 41 50 73 3a 42 72 61 6e 63 68 31 2c 31 ...
060 Vendor Class Identifier	Standard	ArubaInstantAP

Option 43 Example

Scope Options

General Advanced

Available Options

	Description
<input type="checkbox"/> 040 NIS Domain Name	Name of Ne...
<input type="checkbox"/> 041 NIS Servers	Addresses c...
<input type="checkbox"/> 042 NTP Servers	Addresses c...
<input checked="" type="checkbox"/> 043 Vendor Specific Info	Embedded ✓

Data entry

Data:	Binary:	ASCII:
0000	49 41 50 73 3A 42 72 61	IAPs: Bra
0008	6E 63 68 31 2C 31 39 32	nch1.192
0010	2E 31 36 38 2E 36 36 2E	.168.66.
0018	32 30 2C 41 72 75 62 61	20, Aruba
0020	31 32 33	123

OK Cancel Apply

Option 60 Example

Scope Options

General Advanced

Available Options

	Description
<input type="checkbox"/> 047 NetBIOS Scope ID	NetBIOS ov...
<input type="checkbox"/> 048 X Window System Font	Array of X W...
<input type="checkbox"/> 049 X Window System Display	Array of X W...
<input checked="" type="checkbox"/> 060 Vendor Class Identifier	Vendor Clas...

Data entry

String value:

ArubaInstantAP

OK Cancel Apply

HTTP Proxy Example

DHCP Scope Example

Option Name	Vendor	Value
003 Router	Standard	192.168.77.1
006 DNS Servers	Standard	192.168.66.3
015 DNS Domain Name	Standard	lab.marshalls.local
060 Vendor Class Identifier	Standard	ArubaInstantAP
148 iap-proxy	Standard	server=192.168.66.30,port=8080,username=...

Predefined Option

Option Type

Class:Global

Name:iap-proxy

Data type:String

String

Array

Code:148

Description:

OK

Cancel

Option 148 Example

Option 60 Example

Scope Options

General

Advanced

Available Options

075 StreetTalk Servers

List of StreetTalk Servers

076 StreetTalk Directory Assistance (STDA) Servers

List of STDA Servers

121 Classless Static Routes

Destination

148 iap-proxy

Data entry

String value:

server=192.168.66.30,port=8080,username=iap1

OK

Cancel

Apply

Scope Options

General

Advanced

Available Options

047 NetBIOS Scope ID

NetBIOS over LAN

048 X Window System Font

Array of X Window System Fonts

049 X Window System Display

Array of X Window System Displays

060 Vendor Class Identifier

Vendor Class Identifier

Data entry

String value:

ArubaInstantAP

OK

Cancel

Apply

Campus Mode Access Points

Mobility Controller Discovery Example

DHCP Scope Example

Option Name	Vendor	Value
003 Router	Standard	192.168.77.1
006 DNS Servers	Standard	192.168.66.3
015 DNS Domain Name	Standard	lab.marshalls.local
043 Vendor Specific Info	Standard	31 39 32 2e 31 36 38 2e 37 32 2e 31 35
060 Vendor Class Identifier	Standard	ArubaAP

Scope Options – Option 43

Scope Options – Option 60

Unified Access Points
Campus Mode Conversion Example

DHCP Scope Example

Option Name	Vendor	Value
003 Router	Standard	192.168.77.1
006 DNS Servers	Standard	192.168.66.3
015 DNS Domain Name	Standard	lab.marshalls.local
043 Vendor Specific Info	Standard	31 39 32 2e 31 36 38 2e 37 32 2e 31 35
060 Vendor Class Identifier	Standard	ArubaAP

Scope Options – Option 43

Scope Options – Option 60

DHCP Discover Packet Decodes

Instant Mode / Unified Access Points

DHCP Discover

[illegible]

Option 61 – Client Identifier Field

- Option: (61) Client identifier
 - Length: 7
 - Hardware type: Ethernet (0x01)
 - Client MAC address: HewlettP c2:1b:48 (90:4c:81:c2:1b:48)

Option 60 – Vendor Class Identifier Field

```

Option: (60) Vendor class identifier
Length: 14
Vendor class identifier: ArubaInstantAP

```

Option 55 – Parameter Request List

```

Option: (55) Parameter Request List
Length: 12
Parameter Request List Item: (1) Subnet Mask
Parameter Request List Item: (3) Router
Parameter Request List Item: (4) Time Server
Parameter Request List Item: (6) Domain Name Server
Parameter Request List Item: (12) Host Name
Parameter Request List Item: (15) Domain Name
Parameter Request List Item: (28) Broadcast Address
Parameter Request List Item: (42) Network Time Protocol Servers
Parameter Request List Item: (43) Vendor-Specific Information
Parameter Request List Item: (60) Vendor class identifier
Parameter Request List Item: (66) TFTP Server Name
Parameter Request List Item: (67) Bootfile name

```

Campus Mode Access Points

DHCP Discover

[illegible]

Option 61 – Client Identifier Field

```

  ▾ Option: (61) Client identifier
    Length: 7
    Hardware type: Ethernet (0x01)
    Client MAC address: HewlettP c2:1b:48 (90:4c:81:c2:1b:48)

```

Option 60 – Vendor Class Identifier Field

```

Option: (60) Vendor class identifier
  Length: 7
  Vendor class identifier: ArubaAP

```

Option 55 – Parameter Request List

```

Option: (55) Parameter Request List
Length: 10
Parameter Request List Item: (1) Subnet Mask
Parameter Request List Item: (3) Router
Parameter Request List Item: (4) Time Server
Parameter Request List Item: (6) Domain Name Server
Parameter Request List Item: (12) Host Name
Parameter Request List Item: (15) Domain Name
Parameter Request List Item: (28) Broadcast Address
Parameter Request List Item: (42) Network Time Protocol Servers
Parameter Request List Item: (43) Vendor-Specific Information
Parameter Request List Item: (60) Vendor class identifier

```


DHCP Offer Decodes

Instant Mode Access Points

DHCP Offer

```
> Frame 130: 469 bytes on wire (3752 bits), 469 bytes captured (3752 bits) on interface 0
> Ethernet II, Src: sw-lab-vlan77.lab.marshalls.local (3c:0e:23:1a:e3:f3), Dst: HewlettP_c2:1b:48 (90:4c:81:c2:1b)
> Internet Protocol Version 4, Src: sw-lab-vlan77.lab.marshalls.local (192.168.77.1), Dst: 192.168.77.104 (192.168.77.104)
> User Datagram Protocol, Src Port: 67, Dst Port: 68
▼ Bootstrap Protocol (Offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0x54911b5b
  Seconds elapsed: 0
  > Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 192.168.77.104 (192.168.77.104)
  Next server IP address: 192.168.66.3 (192.168.66.3)
  Relay agent IP address: sw-lab-vlan77.lab.marshalls.local (192.168.77.1)
  Client MAC address: HewlettP_c2:1b:48 (90:4c:81:c2:1b:48)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
  > Option: (53) DHCP Message Type (Offer)
  > Option: (1) Subnet Mask
  > Option: (58) Renewal Time Value
  > Option: (59) Rebinding Time Value
  > Option: (51) IP Address Lease Time
  > Option: (54) DHCP Server Identifier
  > Option: (3) Router
  > Option: (6) Domain Name Server
  > Option: (15) Domain Name
  > Option: (60) Vendor class identifier
  > Option: (148) Unassigned
  > Option: (43) Vendor-Specific Information (Aruba Instant AP)
```

Option 60 – Vendor Class Identifier Field

```
▼ Option: (60) Vendor class identifier
  Length: 15
  Vendor class identifier: ArubaInstantAP
```

Option 43 – AirWave Server Discovery

```
▼ Option: (43) Vendor-Specific Information (Aruba Instant AP)
  Length: 35
  > Aruba Instant AP: IAPs:Branch1:192.168.66.20,Aruba123
```

Option 148 – HTTP Proxy Server

```
▼ Option: (148) Unassigned
  Length: 63
  Value: 7365727665723d3139322e3136382e36362e33302c706f72...
```

0160	72 75 62 61 49 6e 73 74	61 6e 74 41 50 00 94 3f	ArubaInstantAP..?
0170	73 65 72 76 65 72 3d 31	39 32 2e 31 36 38 2e 36	server=1 92.168.6
0180	36 2e 33 30 2c 70 6f 72	74 3d 38 30 38 30 2c 75	6.30,por t=8080,u
0190	73 65 72 6e 61 6d 65 3d	69 61 70 31 2c 70 61 73	sername= iap1,pas
01a0	73 77 6f 72 64 3d 41 72	75 62 61 31 32 33 00 2b	sword=Ar uba123,+
01b0	23 49 41 50 73 3a 42 72	61 6e 63 68 31 3a 31 39	#IAPs:Br anch1:19
01c0	32 2e 31 36 38 2e 36 36	2e 32 30 2c 41 72 75 62	2.168.66 .20,Arub
01d0	61 31 32 33 ff		a123.

Campus Mode / Unified Access Points

DHCP Offer

```
> Frame 6: 375 bytes on wire (3000 bits), 375 bytes captured (3000 bits) on interface 0
> Ethernet II, Src: Cisco_1a:e3:f3 (3c:0e:23:1a:e3:f3), Dst: HewlettP_c2:1b:48 (90:4c:81:c2:1b:48)
> Internet Protocol Version 4, Src: sw-lab-vlan77.lab.marshalls.local (192.168.77.1), Dst: 192.168.77.104 (192.168.77.104)
> User Datagram Protocol, Src Port: 67, Dst Port: 68
▼ Bootstrap Protocol (Offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0x3e3d2a27
  Seconds elapsed: 0
  > Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0 (0.0.0.0)
  Your (client) IP address: 192.168.77.104 (192.168.77.104)
  Next server IP address: 192.168.66.3 (192.168.66.3)
  Relay agent IP address: sw-lab-vlan77.lab.marshalls.local (192.168.77.1)
  Client MAC address: HewlettP_c2:1b:48 (90:4c:81:c2:1b:48)
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
  > Option: (53) DHCP Message Type (Offer)
  > Option: (1) Subnet Mask
  > Option: (58) Renewal Time Value
  > Option: (59) Rebinding Time Value
  > Option: (51) IP Address Lease Time
  > Option: (54) DHCP Server Identifier
  > Option: (3) Router
  > Option: (6) Domain Name Server
  > Option: (15) Domain Name
  > Option: (60) Vendor class identifier
  > Option: (43) Vendor-Specific Information (Aruba AP)
  > Option: (255) End
```

Option 60 – Vendor Class Identifier Field (Mandatory)

```
▼ Option: (60) Vendor class identifier
  Length: 8
  Vendor class identifier: ArubaAP
```

Option 43 – Mobility Controller Discovery / Campus Conversion

```
▼ Option: (43) Vendor-Specific Information (Aruba AP)
  Length: 13
  Aruba Controller IP: 192.168.72.15
```

AP Boot Console

Instant Mode / Unified Access Points

Console Output

```
Starting DHCP
Getting an IP address...
Jan  1 00:00:32 udhcpd[4387]: udhcpd (v0.9.9-pre) started
Jan  1 00:00:33 udhcpd[4387]: send_discover: pkt num 0, secs 0
Jan  1 00:00:33 udhcpd[4387]: Sending discover...
Jan  1 00:00:33 udhcpd[4387]: send_selecting: pkt num 0, secs 0
Jan  1 00:00:33 udhcpd[4387]: Sending select for 192.168.77.104...
Jan  1 00:00:33 udhcpd[4387]: Lease of 192.168.77.104 obtained, lease time 691200
Jan  1 00:00:33 udhcpd[4387]: DHCP OPT 60 is ArubaInstantAP
Jan  1 00:00:33 udhcpd[4387]: DHCP OPT 43, len: 35, option43: IAPs:Branch1:192.168.66.20,Aruba123
Jan  1 00:00:33 udhcpd[4387]: DHCP OPT 43 for airwave provisioning
Jan  1 00:00:33 udhcpd[4387]: DHCP OPT 43, len: 35, buf: IAPs:Branch1:192.168.66.20,Aruba123
Jan  1 00:00:33 udhcpd[4387]: amp-domain: Aruba123
Jan  1 00:00:33 udhcpd[4387]: nameserver is ready
Jan  1 00:00:33 udhcpd[4387]: domain lab.marshalls.local nameserver 192.168.66.3
Jan  1 00:00:33 udhcpd[4387]: DHCP http proxy, buf: server=192.168.66.30,port=8080,username=iap1,password=Aruba123
Jan  1 00:00:33 udhcpd[4387]: dhcp_http_proxy server: 192.168.66.30, port: 8080, username: iap1, password: *****
```

Campus Mode Access Points

Console Output

```
Starting watchdog process...
Getting an IP address...
device eth0 entered promiscuous mode
192.168.77.103 255.255.255.0 192.168.77.1
Running ADP...Done. Master is 192.168.72.15
```


For more information

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