



## **Air Time Fairness(ATF) Phase1 and Phase 2 Deployment Guide**

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# Introduction

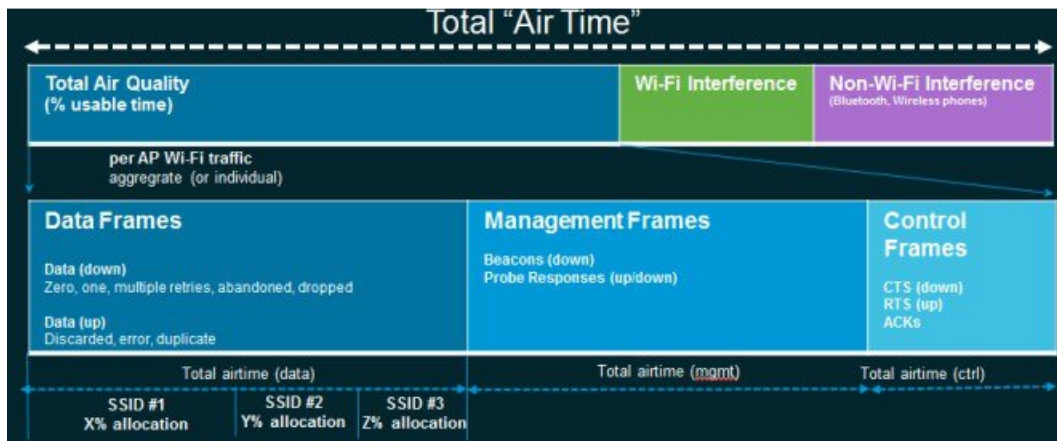
This document introduces ATF (Air Time Fairness) feature, and provides general guidelines for its deployment. The purpose of this document is to:

- Provide an overview of ATF feature, and its deployment within the Cisco Unified Architecture.
- Highlight key Service Provider features

## Introduction to Air Time Fairness (ATF) Phase 1

Traditional (wired) implementations of QOS regulate egress bandwidth. With wireless networking, the transmission medium is via radio waves that transmit data at varying rates. Instead of regulating egress bandwidth, it makes more sense to regulate the amount of airtime needed to transmit frames. Air Time Fairness (ATF) is a form of wireless QOS that regulates downlink airtime (as opposed to egress bandwidth). Large scale, high density Wi-Fi deployments are driving this feature. Wireless Network owners are mandating that their applications be allocated some fixed percentage of the total bandwidth of the Wi-Fi network. At the same time, with capital sharing being considered with multiple cellular providers, ATF is needed to ensure fairness of usage across operators.

Before a frame is transmitted, the ATF budget for that SSID is checked to ensure that there is sufficient airtime budget to transmit the frame. Each SSID can be thought of as having a token bucket (1 token = 1 microsecond of airtime). If the token bucket contains enough airtime to transmit the frame, it is transmitted over the air. Otherwise, the frame can either be dropped or deferred. While the concept of dropping a frame is obvious, deferring a frame deserves further explanation. Deferring a frame means that the frame is not admitted into the Access Category Queue (ACQ). Instead, it remains in the Client Priority Queue (CPQ) and may be transmitted at a later time when the corresponding token bucket contains a sufficient number of tokens (unless the CPQ reaches capacity, at which point the frame will be dropped regardless). The majority of the work involved for ATF takes place on the access points. The wireless controller is used simply to configure the feature and display results.



## Cisco Air Time Fairness (ATF) Use Cases

Public Hotspots (Stadium/Airport/Convention Center/Other)

In this instance a public network is sharing a WLAN between two (or more) service providers and the venue. Subscribers to each service provider can be grouped and each group can be allocated a certain percentage of airtime.

### **Education**

In this instance, a university is sharing a WLAN between students, faculty, and guests. The guest network can be further partitioned by service provider. Each group can be assigned a certain percentage of airtime.

### **Enterprise or Hospitality or Retail**

In this instance, the venue is sharing a WLAN between employees and guests. The guest network can be further partitioned by service provider. The guests could be sub-grouped by tier of service type with each subgroup being assigned a certain percentage of airtime, for example a paid group is entitled to more airtime than the free group.

### **Time Shared Managed Hotspot**

In this instance, the business entity managing the hotspot, such as a service provider or an enterprise, can allocate and subsequently lease airtime to other business entities.

### **ATF Functionality and Capabilities**

- ATF policies are applied only in the downlink direction (AP transmitting frames to client). Only airtime in the downlink direction, that is AP to client, can be controlled accurately by the AP. Although airtime in the uplink direction, that is client to AP, can be measured, it cannot be strictly controlled. Although the AP can constrain airtime for packets that it sends to clients, the AP can only measure airtime for packets that it ‘hears’ from clients because it cannot strictly limit their airtime.
- ATF policies are applied only on wireless data frames; management and control frames gets ignored.
- When ATF is configured per-SSID, each SSID is granted airtime according to the configured policy.
- ATF can be configured to either drop or defer frames that exceed their airtime policies. If the frame is deferred, it will be buffered and transmit at some point in the future when the offending SSID has a sufficient airtime budget. Of course, there is a limit as to how many frames can be buffered. If this limit is crossed, frames will be dropped regardless.
- ATF can be globally enabled or disabled
- ATF can be enabled or disabled on an individual access point, AP group or entire network
- ATF is supported in release 8.4 on the **1260, 1700, 2600, 2700, 3600, 3500, 3700, 1550-128mb**, and **1570** series access points in **local** and **FlexConnect** mode.
- ATF on Mesh is supported in release **8.4** on **1550-128mb, 1560, 1570** and **3700** series MAPs.
- ATF results and statistics are available on the wireless controller.

## **ATF Modes of Operation**

The Framework behind the ATF monitor mode is to allow the user to view and get the stats of overall Air Time being used i.e. to report the Air Time usage for all the AP transmissions. The ATF in monitor mode can be enabled on following levels.

- **Disable Mode:** By default ATF is disabled on the WLC
- **Monitor Mode:** To monitor airtime usage on your network
- **Enforce—Policy Mode:** Assigning ATF policies on your network
  - **Strict Enforcement**
  - **Optimized**

## Monitor Mode Configuration

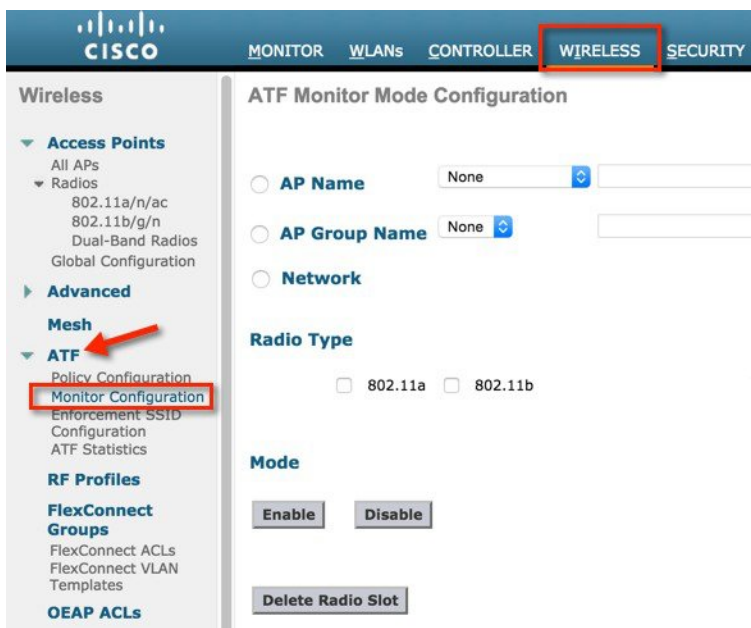
The Framework behind the ATF monitor mode is to allow the user to view and get the stats of overall Air Time being used i.e. to report the Air Time usage for all the AP transmissions. The ATF in monitor mode can be enabled on following levels:

- Per AP
- Per AP Group
- Network (all APs)

To configure ATF in monitor mode, perform the following steps:

### Procedure

- Step 1** Choose **WIRELESS > ATF > Monitor Configuration** from WLC's main menu bar.
- Step 2** Select **AP Name** or **AP Group Name** or **Network** (all the APs on that particular WLC).
- Step 3** Select radio type **802.11a** (5 GHz) or **802.11b** (2.4 GHz) or both.



## Per AP Monitoring Configuration

For AP monitoring configuration, perform the following steps

### Procedure

- Step 1** Click **AP Name** and from the drop down menu choose the AP.

ATF Monitor Mode Configuration

**AP Name**  **AP Group Name**  **Network**

**Radio Type**

802.11a  802.11b

**Mode**

[Config Level](#) [AP Name](#) [Radio Slots](#)

**Step 2** Choose the **Radio Type** by checking the 802.11a or 802.11b or both radio boxes and click **Enable** under the **Mode** option.

ATF Monitor Mode Configuration

**AP Name**  **AP Group Name**  **Network**

**Radio Type**

802.11a  802.11b

**Mode**

[Config Level](#) [AP Name](#) [Radio Slots](#)

Once configuration is done it displays the config level, AP name and radio slots (**Slot 0 is 802.11b Radio and Slot 1 is 802.11a Radio**) on which monitoring is enabled.

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## Per AP Group Monitoring Configuration

For per AP group monitoring configuration, perform the following steps:

### Procedure

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**Step 1** Click **AP Group Name** and from the drop down menu choose the AP Group.

ATF Monitor Mode Configuration

**AP Name**

**AP Group Name**

**Network**

ATF Monitor Mode Configuration

**AP Name**

**AP Group Name**

**Network**

Conf-Room-1  
Conf-Room-2  
SJC14-Lobby

**Step 2** Choose the **Radio Type** by checking the 802.11a or 802.11b or both radio boxes and click **Enable** under the **Mode** option.

ATF Monitor Mode Configuration

**AP Name**

**AP Group Name**

**Network**

**Radio Type**

802.11a  802.11b

**Mode**

[Config Level](#) [AP Group Name](#) [Radio Slots](#)

Once configuration is done it displays the config level, AP name and radio slots (**Slot 0 is 802.11b Radio and Slot 1 is 802.11a Radio**) on which monitoring is enabled.

### ATF Monitor Mode Configuration

**AP Name**

**AP Group Name**

**Network**

#### Radio Type

802.11a  802.11b

#### Mode

<input type="checkbox"/>	Config Level	AP Group Name	Radio Slots
<input type="checkbox"/>	Per AP Group	Conf-Room-1	0 1

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## ATF Network Monitoring Configuration

To monitor Air Time on the network, perform the following steps:

### Procedure

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**Step 1** Click **Network** and this displays the monitor is disabled on the network.

#### ATF Monitor Mode Configuration

**AP Name**

**AP Group Name**

**Network**  **802.11a** Disable  **802.11b** Disable

**Step 2** Choose the **Radio Type** by checking the 802.11a or 802.11b or both radio boxes then click **Enable** under the **Mode** option

### ATF Monitor Mode Configuration

AP Name

AP Group Name

Network **802.11a** Disable  
**802.11b** Disable

**Radio Type**

802.11a  802.11b

**Mode**

When ATF network monitoring is configured user can see that Radio status change to Monitor from Disable state.

### ATF Monitor Mode Configuration

AP Name

AP Group Name

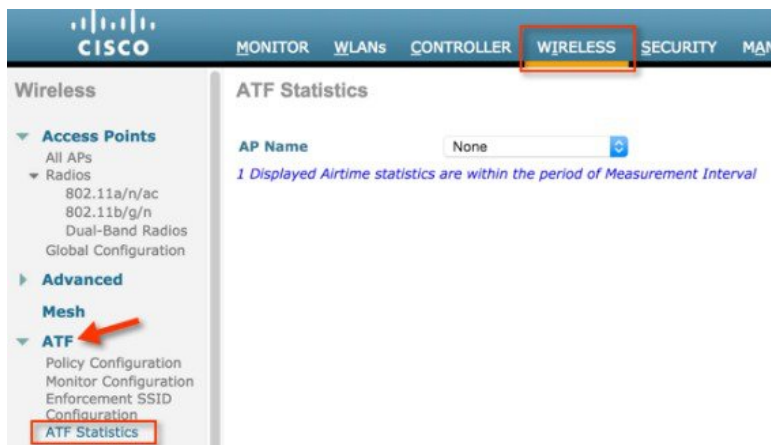
Network **802.11a** Monitor  
**802.11b** Monitor

## Monitoring ATF Statistics

### Procedure

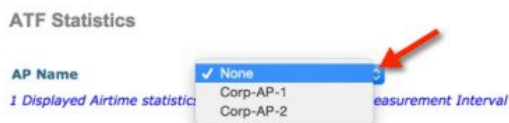
**Step 1** To view the ATF statistics from WLC main menu go to **WIRELESS > ATF > ATF Statistics**.

**Note** Currently in this release ATF statistics are only available per AP.



**Step 2** Choose the AP from the AP Name dropdown list.





The ATF statistics will show under two following values:

- Instantaneous Values
- Accumulated Values

The Instantaneous values reflect the ATF stats through the measurement interval and Instantaneous Radio uptime. By default the measurement interval is set to 180 sec. This is configurable in the range 0 to 65535 on the AP.

User can view the atf stats per WLAN for both 802.11a and 802.11b radios which shows the percentage of AirTime (%abs), percentage of Realtime AirTime(%rel), AirTime used value in milliseconds (ms)

- AirTime (%abs)—Number of airtime units being used per SSID
- Relative AirTime (%rel)—Percentage of time used per SSID
- Airtime Used(ms)—Total airtime used per SSID

The Accumulative Values are the instantaneous ATF statistics which were accumulated over the measurement interval.

**Instantaneous Values**

Measurement Interval 180 sec

Instantaneous Radio Uptime 802.11a : 178 sec  
802.11b : 178 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used(ms)	Sent (KBytes)	Sent (Frames)	Dropped (KBytes)	Dropped (Frames)
0	802.11b	1 (Corp-Employee)	0	0	0	0	0	0	0
0	802.11b	2 (Corp-Guest)	0	0	0	0	0	0	0
0	802.11b	RadioTotal	0	0	0	0	0	0	0
1	802.11a	1 (Corp-Employee)	0	91	77	159	364	0	0
1	802.11a	2 (Corp-Guest)	0	9	7	1	22	0	0
1	802.11a	RadioTotal	0	100	84	160	386	0	0

**Accumulated Values**

Cumulative Radio Uptime 802.11a : 4177 sec  
802.11b : 4177 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used	Sent (KBytes)	Sent (Frames)	Dropped (KBytes)	Dropped (Frames)
0	802.11b	1 (Corp-Employee)	0	0	0 d,00:00:00.0	0	0	0	0
0	802.11b	2 (Corp-Guest)	0	100	0 d,00:00:00.0	6	50	0	0
0	802.11b	RadioTotal	0	100	0 d,00:00:00.0	6	50	0	0
1	802.11a	1 (Corp-Employee)	0	0	0 d,00:00:01.1	4923	9234	0	0
1	802.11a	2 (Corp-Guest)	103	100	0 d,01:11:34.294	4192286	4294966031	0	0
1	802.11a	RadioTotal	103	100	0 d,01:11:36.84	4197209	7969	0	0

1 Displayed Airtime statistics are within the period of Measurement Interval

## Disabling ATF Monitor Mode

### Procedure

**Step 1** To disable the ATF monitoring navigate to **WIRELESS > ATF > Monitor Configuration**.

**Step 2** Choose the options **AP Name**, **AP group** and **Network** from the drop down menu, whichever the user has previously enabled. Select the **Radio Type** the user want to disable and click **Disable**.

**ATF Monitor Mode Configuration**

**AP Name**

**AP Group Name**

**Network** **802.11a** Monitor  
**802.11b** Monitor

**Radio Type**

802.11a  802.11b

**Mode**

**Step 3** Click **OK** on the pop up conformation to disable the ATF.

**ATF Monitor Mode Configuration**

**AP Name**

**AP Group Name**

**Network** **802.11a** Monitor  
**802.11b** Monitor

**Radio Type**

802.11a  802.11b

**Mode**

The page at <https://10.10.20.2> says:  
Are you sure you want to disable Monitor mode for selected entity?

**ATF Monitor Mode Configuration**

**AP Name**

**AP Group Name**

**Network** **802.11a** Disable  
**802.11b** Disable

**Radio Type**

802.11a  802.11b

**Mode**

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## ATF Enforce-Policy Mode

The Enforcement of Air Time is based on the configured Policy. The ATF Policy/Policies are set by user according to the network requirements.

Air-Time can be Enforced on following parameters:

- WLAN and on all APs connected within a WLC's network
- Per AP group
- On an individual AP

**Strict Enforcement** per WLAN—Air-Time used by the WLANs on a Radio will be strictly enforced up to the configured limits in the Policies

**Optimal Enforcement** per WLAN—Share unused air-time from other SSIDs

## Steps to Configure ATF

### Create Policy

To configure ATF first the user need to create or configure ATF policy.

#### Procedure

**Step 1** Navigate **WIRELESS > ATF > Policy Configuration**.

**Step 2** The **Default** policy is 10 and the user has to assign weight from 5 to 100.

The screenshot shows the Cisco WLC configuration interface. The top navigation bar includes 'MONITOR', 'WLANs', 'CONTROLLER', 'WIRELESS', and 'SECURITY'. The 'WIRELESS' tab is selected. On the left sidebar, under 'Wireless', the 'ATF' section is expanded, and 'Policy Configuration' is highlighted with a red box and a red arrow. The main content area is titled 'ATF Policy Configuration' and contains a table with columns 'Id', 'Name', and 'Weight'. The table has one entry: Id: 0, Name: Default, Weight: 10. Below the table, it says 'Entries 1 - 1 of 1' and shows a table with columns 'ID', 'Name', and 'Weight' containing the same entry: ID: 0, Name: Default, Weight: 10.

**Step 3** To create user own policy select the policy Id from the drop down menu and assign a name and weight. Here Weight is the percentage of Air Time which user want to assign to a policy.

**Step 4** Click **Create**.

ATF Policy Configuration

Id	Name	Weight
1	atf-80	80

Entries 1 - 1 of 1

ID	Name	Weight
<input type="checkbox"/> 0	Default	10

In the example we have created multiple policies with the name **atf-80** and **atf-20** with the Weights 80 and 20 respectively.

ATF Policy Configuration

Id	Name	Weight
2	atf-20	20

Entries 1 - 3 of 3

ID	Name	Weight
<input type="checkbox"/> 0	Default	10
<input type="checkbox"/> 1	atf-80	80
<input type="checkbox"/> 2	atf-20	20

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## Policy Enforcement on SSID

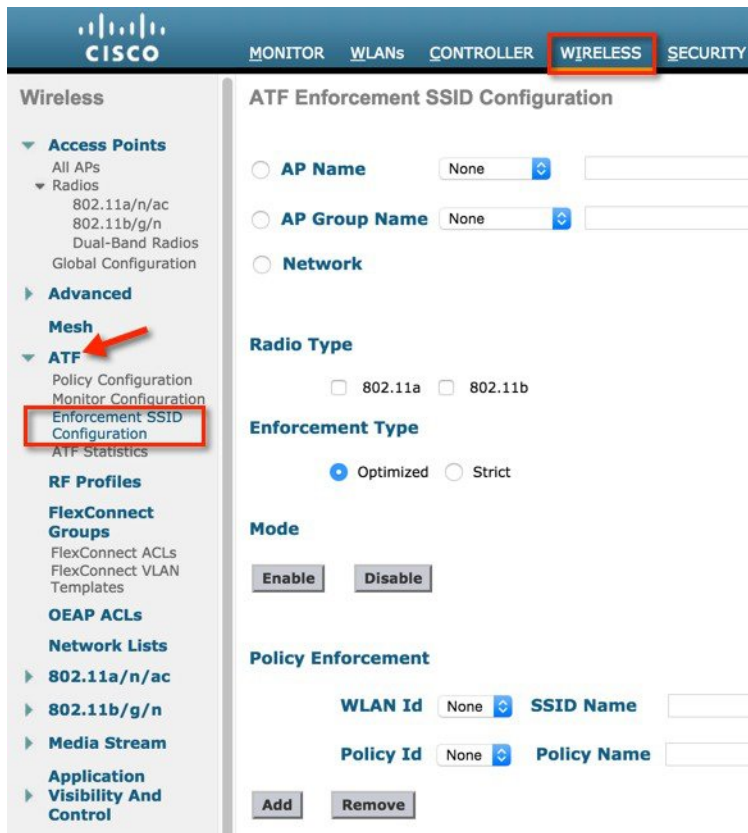


**Note** First disable the WLANs on which you want to enable policy enforcement.

Once the policy is configured user can apply the policy to a particular WLAN or on all WLANs per AP group or on an individual AP.

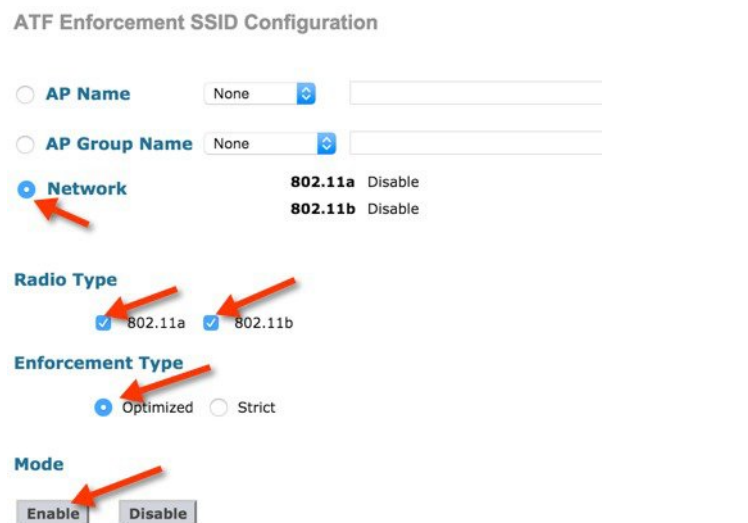
### Procedure

**Step 1** Naviage to the WLC main menu **WIRELESS > ATF > Enforcement SSID Configuration**.



**Step 2** To configure it on the network Select the parameters **Radio Type**, **Enforcement Type** (can select either Optimized or Strict; by default **Optimized** is selected).

**Step 3** Click **Enable** under the **Mode**.



When applied, the webpage gives the popup warning to disable the WLAN id before configuring policy enforcement. Click **Ok**, if the WLAN is disabled the enforcement gets applied.



The policy Enforcement shows on Radios and also the Optimization shows Enabled.

ATF Enforcement SSID Configuration

AP Name    
 AP Group Name    
 Network
 

802.11a	Enforce-Policy	Optimization	Enable
802.11b	Enforce-Policy	Optimization	Enable

Radio Type

802.11a  802.11b

Enforcement Type

Optimized  Strict

**Step 4**

To enable strict enforcement policy then select **Strict** option under Enforcement type.

Strict option does not allow sharing of its weighted ratio slot with other WLANs (SSIDs).

ATF Enforcement SSID Configuration

AP Name    
 AP Group Name    
 Network
 

802.11a	Enforce-Policy	Optimization	Disable
802.11b	Enforce-Policy	Optimization	Disable

Radio Type

802.11a  802.11b

Enforcement Type

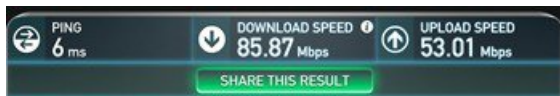
Optimized  Strict

When the ATF configuration is done, then **Enable the WLANs** on which ATF was applied. Once the clients are associated to these WLANs user can view the ATF statistics under the ATF statistics page as previously shown in **Monitoring ATF Statistics** section.

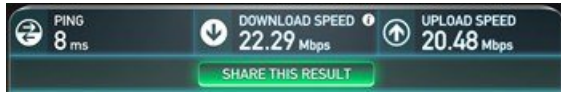
The user can also run a speed test to verify the ATF by configuring two WLANs with different ATF policies.

In the example we have configured two ATF policies, one with weight 80 and other with weight 20.

- a. We connected a wireless client to SSID with ATF policy with weight 80 configured and observe the effect of the ATF on this WLAN by run <https://www.speedtest.net/>



- b. Connected the same wireless client to SSID with ATF policy with configured as 20 and observed the affects of the ATF on that WLAN. You should see speedtest performance on the download side is much slower. The test results might vary due to the air time availability, interference and so on.



## Air Time Fairness—Client Fair Sharing (ATF—Phase 2)

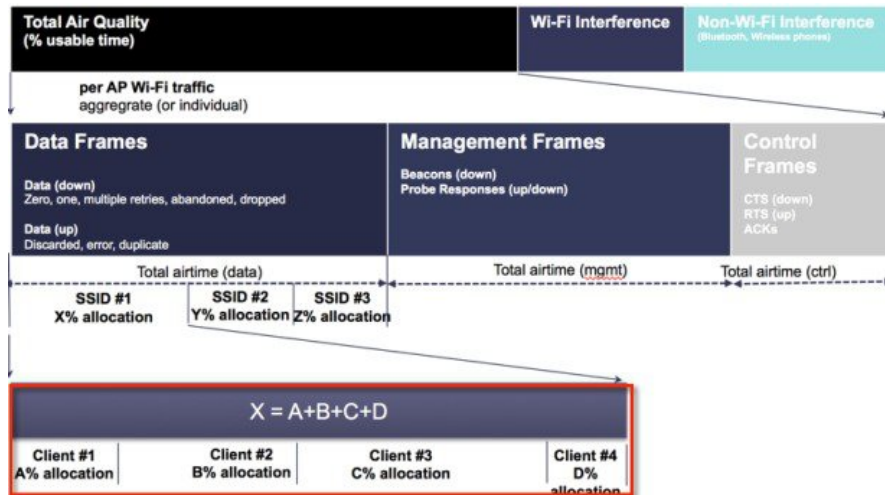
### Feature Description

ATF Client Fair Sharing/per client entitlement is introduced in 8.2 release. Client fair share ensures the clients within a SSID/WLAN are treated equally based on their utilization of the radio bandwidth.

### Benefit

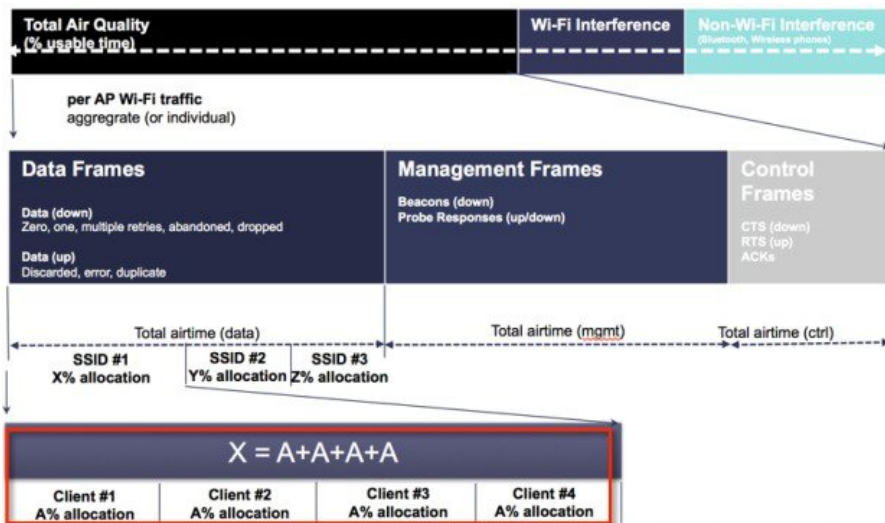
Currently, as part of 8.1 MR2 and MR3 release, SSID based Airtime entitlement is accomplished. However, with SSID based Airtime Fairness, there is no guarantee for the clients within the SSID to be treated equally based on their utilization of the radio bandwidth. There is a potential risk where one or few clients shall end up utilizing the complete airtime allocated for a SSID/WLAN by ruining the opportunity of Wi-Fi experience for rest of the clients within the same SSID.

#### ATF Phase 1 (Without Client Fair Sharing)



To overcome this problem, in 8.2 release each ATF policy have a new option to turn on or off client fair sharing among clients associated to a policy. This option can be executed while creating, modifying the policy in the Wireless LAN Controller. Customer can use this option or feature to provide fair sharing of Airtime between clients associated to a SSID. As shown below all the clients associated to SSID gets equal air time.

#### ATF Phase 2 (With Client Fair Sharing)



# ATF Configuration Overview

## Procedure

- Step 1** First configure WLANs on the controller.
- Step 2** Configure ATF Policies and enable ATF assign those policies to the WLANs.
- Step 3** Connect clients to the ATF enabled WLAN and use media stream applications such as YouTube or [www.speedtest.net](http://www.speedtest.net) and observe throughput performance with different ATF policies and weights for downstream data traffic.

## Configuration for ATF Phase 2

### Procedure

Create WLANs on the controller in our setup we created two WLANs PODX-atf20 and PODX-atf80.



## Creating ATF Client Fair Sharing Policies

### Procedure



**Step 1** On the Controller GUI under **WIRELESS > ATF** click **Policy Configuration** and configure **Id Name**.

Id Name can be any intuitive name, in our example we are configuring the name **atf20** and **atf80**) for weights of 20 and 80 respectively.

**Step 2** Check the **Client Fair Sharing** box and hit **Create** to Create two policies.

User can assign there own ATF policy weights in example below we are using 20 and 80.

- For ATF Policy1: Id=1 Name=atf20 weight=20
- For ATF Policy2: Id=2 Name=atf80 weight=80



The configuration sets the policy, which can be applied per radio.

The two Policy IDs and Weights define policy Id 1 with weight 20 and the second policy Id 2 with weight 80 and Client Fair Sharing shows Enabled.

#### ATF Policy Configuration

Id	Name	Weight	Client Fair Sharing	
2	atf80	80	<input checked="" type="checkbox"/>	<input type="button" value="Create"/> <input type="button" value="Modify"/> <input type="button" value="Delete"/>

Entries 1 - 3 of 3

ID	Name	Weight	Client Fair sharing
0	Default	10	Disabled
1	atf20	20	Enabled
2	atf80	80	Enabled

**Note** Please note these policies have weighted ratios and not percentages, so the total can exceed 100. The minimum weight can be set to 10.

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## Configure and Enable ATF policy on the Network and per specific Radio Type

### Procedure

---

**Step 1** Navigate **Wireless > ATF > Enforce SSID configuration**.

**Step 2** Select **Network** and select **Radio Type** as 802.11a/b.

**Step 3** Choose the policy Enforcement Type as **Optimized** or **Strict**. Apply policy as **Strict** in the setup.

**Note** When policy configured as **optimized** then WLAN with that option applied to it can share its weighted slot with other WLANs if its own slot is not being used in the given time. **Strict** option does not allow sharing of its weighted ratio slot.



The policy displays that it has been enabled on 5GHz radio and is not Optimized but in Strict mode.



## Apply ATF Policy on WLANs

### Procedure

**Step 1** Navigate **Wireless > ATF > Policy Enforcement**.

**Step 2** Select the **WLAN Id** and **Policy Id**.

**Step 3** Click **Apply**.

We use ATF policy (atf20) for one WLAN and policy (atf80) for another WLAN as shown.

ATF Enforcement SSID Configuration

AP Name

AP Group Name

Network **802.11a** Enforce-Policy **Optimization** Disable  
**802.11b** Disable

Radio Type  
 802.11a  802.11b

Enforcement Type  
 Optimized  Strict

Mode

Policy Enforcement

WLAN Id  SSID Name

Policy Id  Policy Name

WLAN ID	SSID	Policy Name	Weight	Client Fair Sharing
1	POD1-dot1x	Default	10	Disabled

Once the policies are created and applied to the WLANs, users can check this by running **show atf config wlan** command from WLC CLI and also on the GUI.

You can see from the output that ATF policy configured WLANs are set with configured weights of 20 and 80 and the WLAN on which we did not apply the policy is set to default weight of 10. Also check that Client Fair Sharing shows Enabled for ATF polices we created.

Here is an example is from CLI to confirm the policies have been applied

(POD1-WLC) >show atf config wlan

WLAN ID	SSID	Policy-Name	Weight	Client Sharing
1	POD1-dot1x	Default	10	Disabled
2	POD1-atf20	atf20	20	Enabled
3	POD1-atf80	atf80	80	Enabled

---

## Enable WLANs in Disabled State

### Procedure

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**Step 1** Navigate to **ATF > Enforcement SSID Configuration** settings.

The screenshot shows the Cisco Wireless Configuration interface for ATF Enforcement SSID Configuration. The configuration includes:

- AP Name:** None
- AP Group Name:** None
- Network:** 802.11a Enforce-Policy, 802.11b Enforce-Policy, Optimization Disabled
- Radio Type:** 802.11a and 802.11b
- Enforcement Type:** Optimized
- Mode:** Enable
- Policy Enforcement:** WLAN ID, SSID Name, Policy Id, Policy Name

WLAN ID	SSID	Policy Name	Weight	Client Fair Sharing
1	POD1-dot1x	Default	10	Disabled
2	POD1-atf20	atf20	20	Enabled
3	POD1-atf80	atf80	80	Enabled

**Step 2** Connect two wireless clients to SSID that is configured with policy 80 and observe the effect of the ATF on this WLAN.

**Step 3** Run [www.speedtest.net](http://www.speedtest.net) simultaneously on the clients at the same time.

The test results might vary due to the clients capability, interference and other factors.



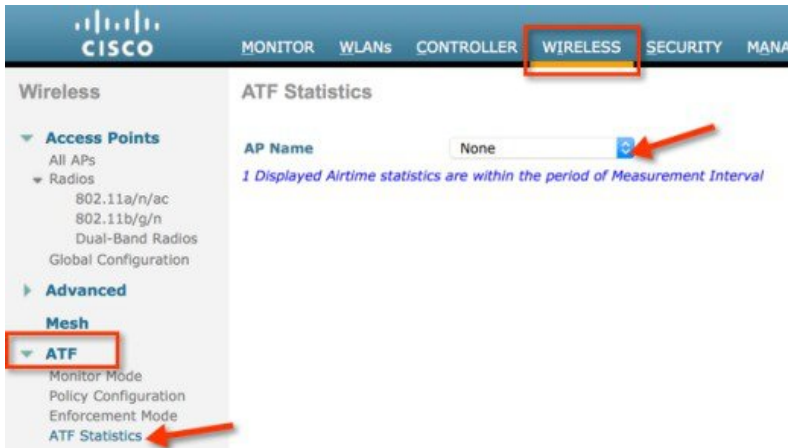
**Step 4** Connect a wireless Client to SSID configured with ATF policy and observe the effects of the ATF on that WLAN.

You should see speedtest performance on the download the test results might vary due to the clients capability, interference and other factors.

## Client ATF Statistics

### Procedure

**Step 1** Navigate **WIRELESS > ATF > ATF Statistics** and then select the **AP Name** from the drop down menu to which the clients are connected.



ATF Statistics page appears where user can view all the ATF enabled WLAN statistics.

**Step 2**

To have a granular view of ATF client fair sharing statistics click **WLAN id** which has client fair sharing enabled as shown.

ATF Statistics

AP Name:   802.11b Disable  
802.11a Enforce-Policy Optimization Disable

**Instantaneous Values**  
Measurement Interval: 5 sec  
Instantaneous Radio Uptime: 802.11a: 5 sec, 802.11b: 0 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used(ms)	Sent (KBytes)	Sent (Frames)	Dropped (KBytes)	Dropped (Frames)
0	802.11b	1 (PODx-atf80)	0	0	0	0	0	0	0
0	802.11b	2 (PODx-atf20)	0	0	0	0	0	0	0
0	802.11b	RadioTotal	0	0	0	0	0	0	0
1	802.11a	1 (PODx-atf80)	40	100	1999	21980	15765	0	0
1	802.11a	2 (PODx-atf20)	0	0	0	0	0	0	0
1	802.11a	RadioTotal	40	100	1999	21980	15765	0	0

**Accumulated Values**  
Cumulative Radio Uptime: 802.11a: 197 sec, 802.11b: 0 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used	Sent (KBytes)	Sent (Frames)	Dropped (KBytes)	Dropped (Frames)
0	802.11b	1 (PODx-atf80)	0	0	0 d,00:00:00.0	0	0	0	0
0	802.11b	2 (PODx-atf20)	0	0	0 d,00:00:00.0	0	0	0	0
0	802.11b	RadioTotal	0	0	0 d,00:00:00.0	0	0	0	0
1	802.11a	1 (PODx-atf80)	1	100	0 d,00:00:02.2	31240	22938	0	0
1	802.11a	2 (PODx-atf20)	0	0	0 d,00:00:00.0	0	0	0	0
1	802.11a	RadioTotal	1	100	0 d,00:00:02.1999	31240	22938	0	0

*1 Displayed Airtime statistics are within the period of Measurement Interval*

**Step 3**

Clicking the client MAC address, users can view the WLAN ATF stats as well as client ATF statistics for all the clients associated with that particular WLAN.

ATF Client Fair Sharing Statistics Per WLAN

< Back

AP Name: POD1-AP **802.11a** Enforce-Policy Optimization: Disable  
 Policy Id: 1 Policy Name: atf80  
 Policy weight: 80 Policy weightage(%): 80.00

Instantaneous Values

Measurement Interval: 5 sec  
 Instantaneous Radio Uptime: 802.11a: 5 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used(ms)	Sent (KBytes)	Sent (Frames)	Dropped (KBytes)	Dropped (Frames)
1	802.11a	1 (PODx-atf80)	0	100	0	0	4	0	0

Accumulated Values

Cumulative Radio Uptime: 802.11a: 645 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used	Sent (KBytes)	Sent (Frames)	Dropped (KBytes)	Dropped (Frames)
1	802.11a	1 (PODx-atf80)	4	100	0 d,00:00:25.25	301536	340285	0	0

Client Statistics

Clients	Instantaneous Airtime	Cumulative Airtime	Sent(Frames)	Dropped(Frames)	Usage Status
	{%abs   %rel   used}	{%abs   %rel   used}			
c0:f2:fb:87:16:11	0   50   342 us	330   3   10 sec	2	342	LOW USAGE
c0:f2:fb:85:f5:3a	0   50   342 us	177   1   8857 ms	2	342	LOW USAGE

ATF Client Fair Sharing Statistics Per Client

AP Name: POD1-AP **802.11a** Enforce-Policy Optimization: Disable  
 Client Mac Address: c0:f2:fb:87:16:11

Instantaneous Values

Measurement Interval: 5 sec  
 Instantaneous Radio Uptime: 802.11a: 5 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used(ms)	Sent (Frames)	Dropped (Frames)
1	802.11a	1 (PODx-atf80)	0	50	0	2	338

Accumulated Values

Cumulative Radio Uptime: 802.11a: 670 sec

Slot	Type	Wlan Id(Name)	AirTime(%abs)	AirTime(%rel)	AirTime Used	Sent (Frames)	Dropped (Frames)
1	802.11a	1 (PODx-atf80)	2	65	0 d,00:00:16.16	195044	16487430

## ATF Client Statistics from WLC CLI

From CLI user can also run the following command to see the atf statistics per client on the WLC

(WLC)> show atf statistics client <MAC addr>

```
(POD1-WLC) >show atf statistics client c0:f2:fb:85:f5:3a
Client MAC Address..... c0:f2:fb:85:f5:3a
Client Username ..... N/A
AP MAC Address..... 74:a0:2f:30:1c:40
AP Name..... POD1-AP
AP radio slot Id..... 1
Wireless LAN Id..... 1
ATF Policy ID..... 1
Wireless LAN Profile Name..... PODx-atf80
Radio Uptime [ Instantaneous | Total ]..... 5 sec | 2460 sec
Total Radio Air Time..... 26sec
Airtime Used ..... 342us | 211ms
Relative Airtime % ..... 50 | 1
Absolute Airtime % ..... 0 | 0

Frames Sent ..... 2 | 897
Frames Dropped ..... 342 | 211830
```

## Client Statistics on AP

If required user can login to AP CLI to see that Clients stats as well by running the following command

```
AP# show controller dot11Radio <0/1> atf
AP # show controller d0/d1 atf cfs client
```



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