

# MDNS/DNS-SD TUTORIAL

In this tutorial, we will describe how to use mDNS/DNS-SD on Raspberry Pi. mDNS/DNS-SD is a protocol for service discovery in a local area network. It is standardized under RFCs 6762 [1] and 6763[2]. The protocol is also known by the *Bonjour* trademark by Apple, or *Zeroconf*. On Linux, it is implemented in the **avahi** package.

[1] <http://tools.ietf.org/html/rfc6762>

[2] <http://tools.ietf.org/html/rfc6763>

## About mDNS/DNS-SD

There are several freely available implementations of mDNS/DNS-SD:

1. **avahi** – Linux implementation (<http://www.avahi.org/>)
2. **jmDNS** – Java implementation (<http://jmdns.sourceforge.net/>)
3. **Bonjour** – MAC OS (installed by default)
4. **Bonjour** – Windows ([https://support.apple.com/kb/DL999?locale=en\\_US](https://support.apple.com/kb/DL999?locale=en_US))

During this course, we will use only **avahi**. However, any of the aforementioned implementations are compatible.

## Avahi installation

**avahi** is available as a package for Raspbian. Install it with:

```
sudo apt-get install avahi-daemon avahi-utils
```

## Avahi usage

*avahi-daemon* is the main process that takes care of proper operation of the protocol. It takes care of any configuration of the interfaces and network messaging. A user can control the daemon with command line utilities, or via D-Bus. In this document, we will describe the former option. For the latter one, please see <http://www.avahi.org/wiki/Bindings>.

## Publishing services

*avahi-publish-service* is the command for publishing services. The syntax is:

```
avahi-publish-service SERVICE-NAME APPLICATION-  
PROTOCOL._TRANSPORT-PROTOCOL PORT "DESCRIPTION" --sub SUBPROTOCOL
```

For instance, the command:

```
avahi-publish-service light _coap._udp 5683 "/mylight" --sub  
_floor1._sub._coap._udp
```

will publish a service named 'light', which uses the CoAP protocol over UDP on port 5683. The same service will be discoverable under "\_coap.\_udp.local" and "\_floor1.\_sub.\_coap.\_udp.local".

Note: upon issuing *avahi-publish-service*, if successful, the process will remain active in the foreground. If it is killed (e.g. by issuing Control+C), it will stop publishing the advertisement. Therefore, when publishing such services, either run them in a separate console, or start them in the background (add **&** at the end). Don't forget to kill any stale service advertisements!

## Discovering services

Services can be discovered using the *avahi-browse* command. The syntax is:

```
avahi-browse [options] service-type
```

where some interesting options are:

-a: browse for all service types, not just the ones listed.

-r: resolve services automatically.

-p: display output in parsable format.

-t: terminate immediately after doing one discovery round. By default, *avahi-browse* remains active and keeps looking for matching services.

Examples:

1. Discover all CoAP servers and automatically resolve them:

```
$ avahi-browse -rt _coap._udp  
+ eth1 IPv6 light  
_coap._udp local
```

```

+ eth1 IPv4 light
_coap._udp          local
+ eth0 IPv6 light
_coap._udp          local
+ eth0 IPv4 light
_coap._udp          local
= eth1 IPv6 light
_coap._udp          local
  hostname = [instant-contiki.local]
  address = [fe80::20c:29ff:fe79:e439]
  port = [5683]
  txt = ["/mylight"]
= eth1 IPv4 light
_coap._udp          local
  hostname = [instant-contiki.local]
  address = [192.168.2.64]
  port = [5683]
  txt = ["/mylight"]
= eth0 IPv6 light
_coap._udp          local
  hostname = [instant-contiki.local]
  address = [fe80::20c:29ff:fe79:e42f]
  port = [5683]
  txt = ["/mylight"]
= eth0 IPv4 light
_coap._udp          local
  hostname = [instant-contiki.local]
  address = [192.168.10.130]
  port = [5683]
  txt = ["/mylight"]

```

2. Discover the CoAP server at floor1, and show it in parsable format:

```

$ avahi-browse -rtp _floor1._sub._coap._udp
+;eth1;IPv6;light;_coap._udp;local
+;eth1;IPv4;light;_coap._udp;local
+;eth0;IPv6;light;_coap._udp;local
+;eth0;IPv4;light;_coap._udp;local
=;eth1;IPv6;light;_coap._udp;local;instant-
contiki.local;fe80::20c:29ff:fe79:e439;5683;"/mylight"
=;eth0;IPv6;light;_coap._udp;local;instant-
contiki.local;fe80::20c:29ff:fe79:e42f;5683;"/mylight"
=;eth1;IPv4;light;_coap._udp;local;instant-
contiki.local;192.168.2.64;5683;"/mylight"
=;eth0;IPv4;light;_coap._udp;local;instant-
contiki.local;192.168.10.130;5683;"/mylight"

```