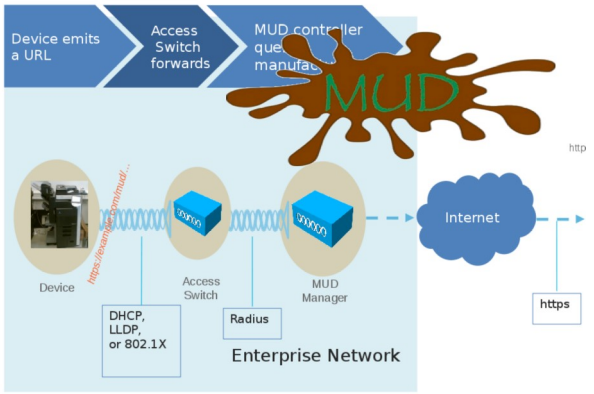
STUFF


Device emits a URL
Access Switch forwards
MUD
http
Internet
Device
Access Switch
MUD Manager
https
DHCP, LLDP, or 802.1X
Radius
Enterprise Network

MUD (RFC8520) overview

Manufacturer Usage Description RFC8520

These slides adapted
From a set from Eliot Lear

Manufacturer Usage Description addresses four questions:

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What is this Thing?

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- The MUD URL identifies the device to the network. It can provide it's model name/type!
  - [BRSKI can provide the serial number]
- Informs the NOC or resident what is on their network

Manufacturer Usage Description addresses four questions:

What is this Thing?

Who is responsible for it?

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Who is responsible for it?

- If something breaks, who should be called?

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- With which devices should it communicate?

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What is this Thing?

Who is responsible for it?

What access does it need?

Is it doing what it should be doing?

- With which devices is it actually communicating?
- Is it behaving as designed?

Background Assumptions and Assertions

Assumptions

Assertions

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Not true
For desktops, Phones, and Devices that Learn skills

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Third parties Can provide Additional advice

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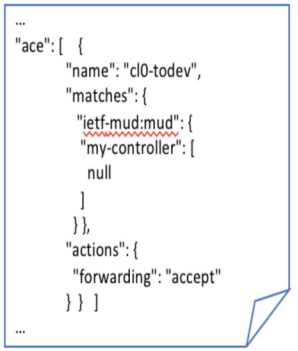
Positive Identification Of each Device Enables Additional controls

Introducing
Manufacturer Usage Descriptions (MUD)

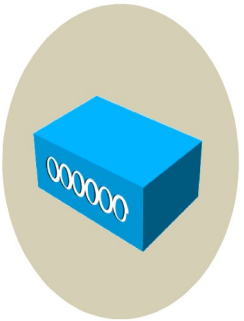
A URL:

The MUD File Server:

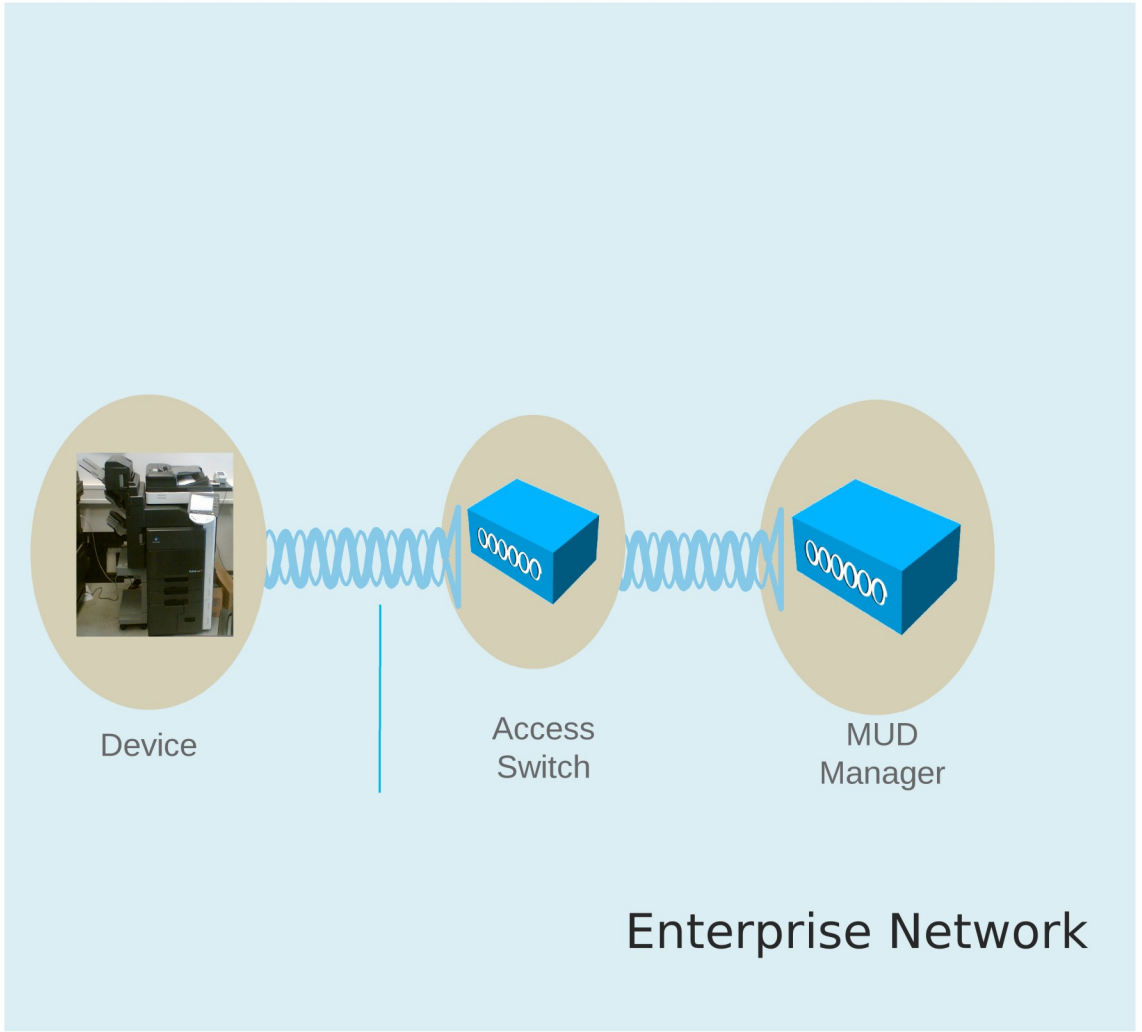
A MUD File:



The MUD Manager:



Expressing Manufacturer Usage Descriptions



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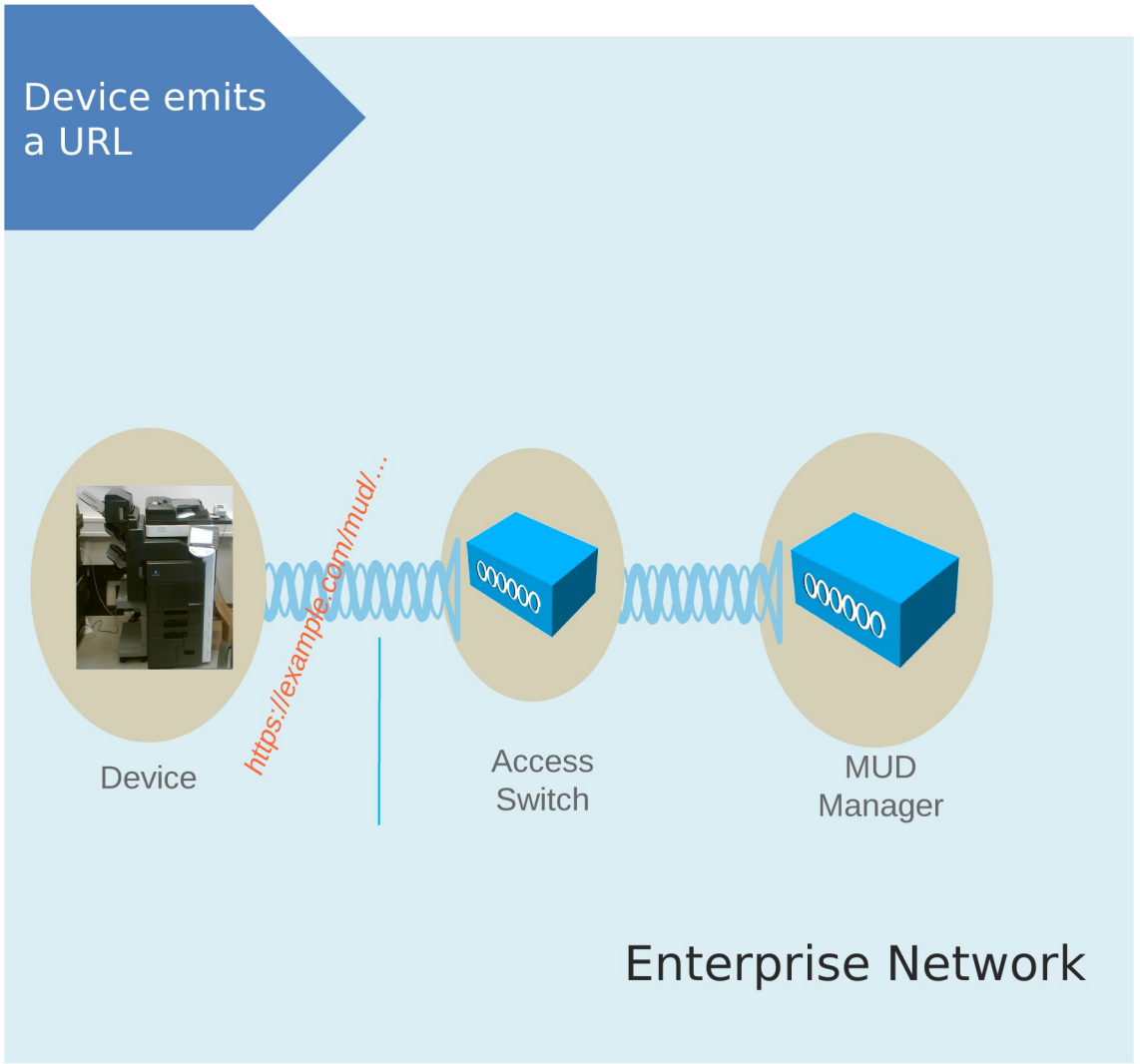

MUD File
Server

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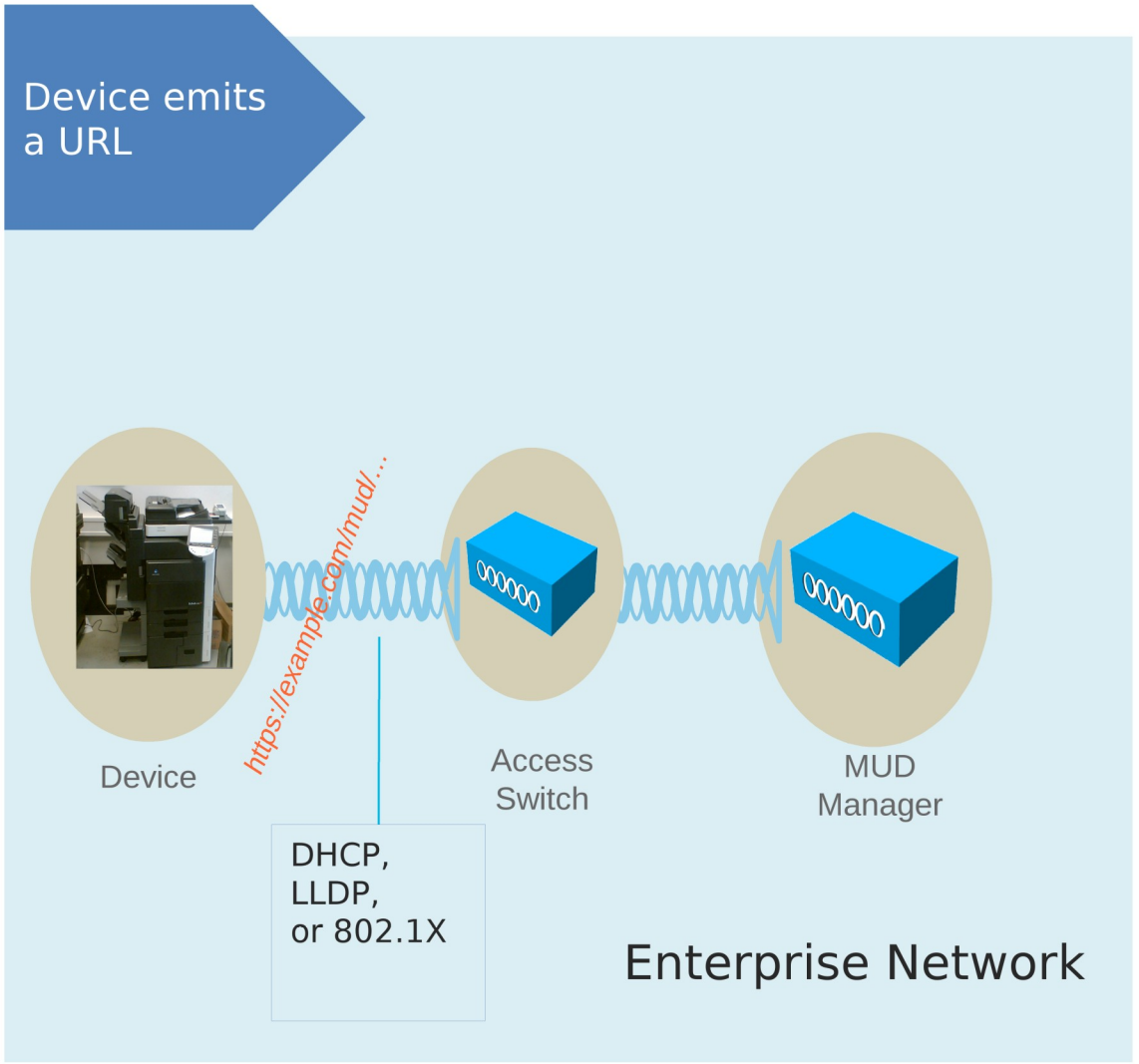

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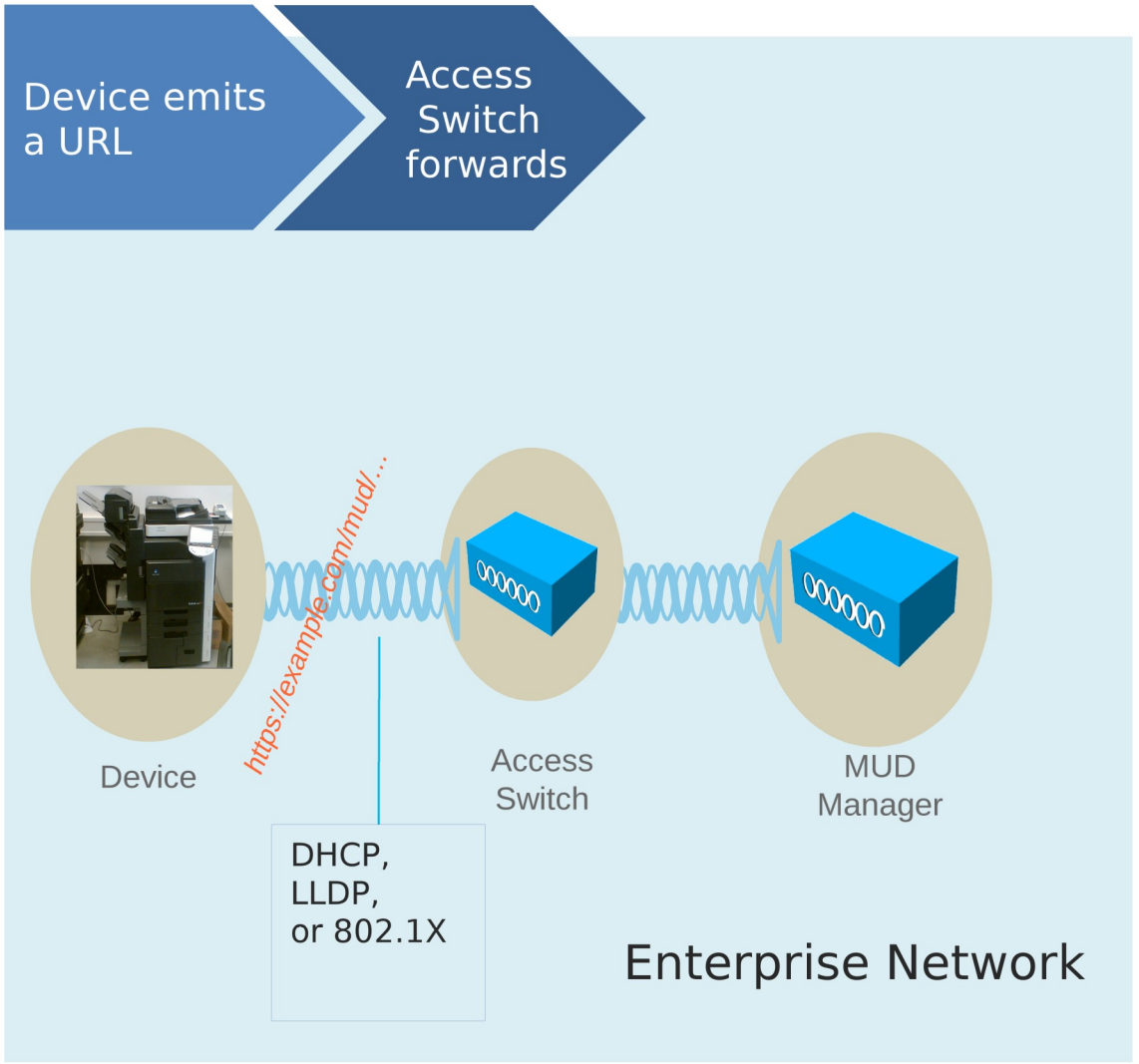

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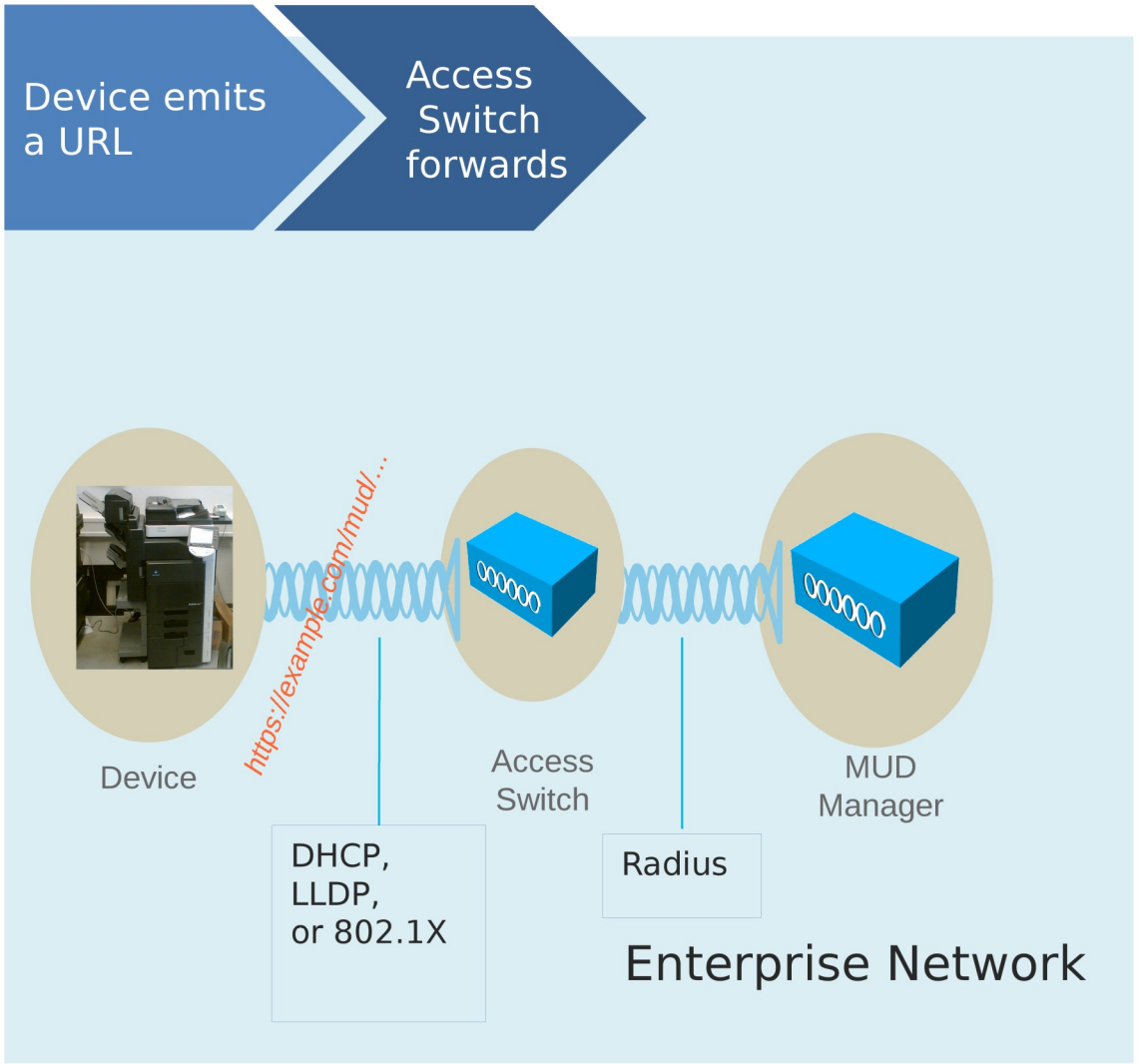

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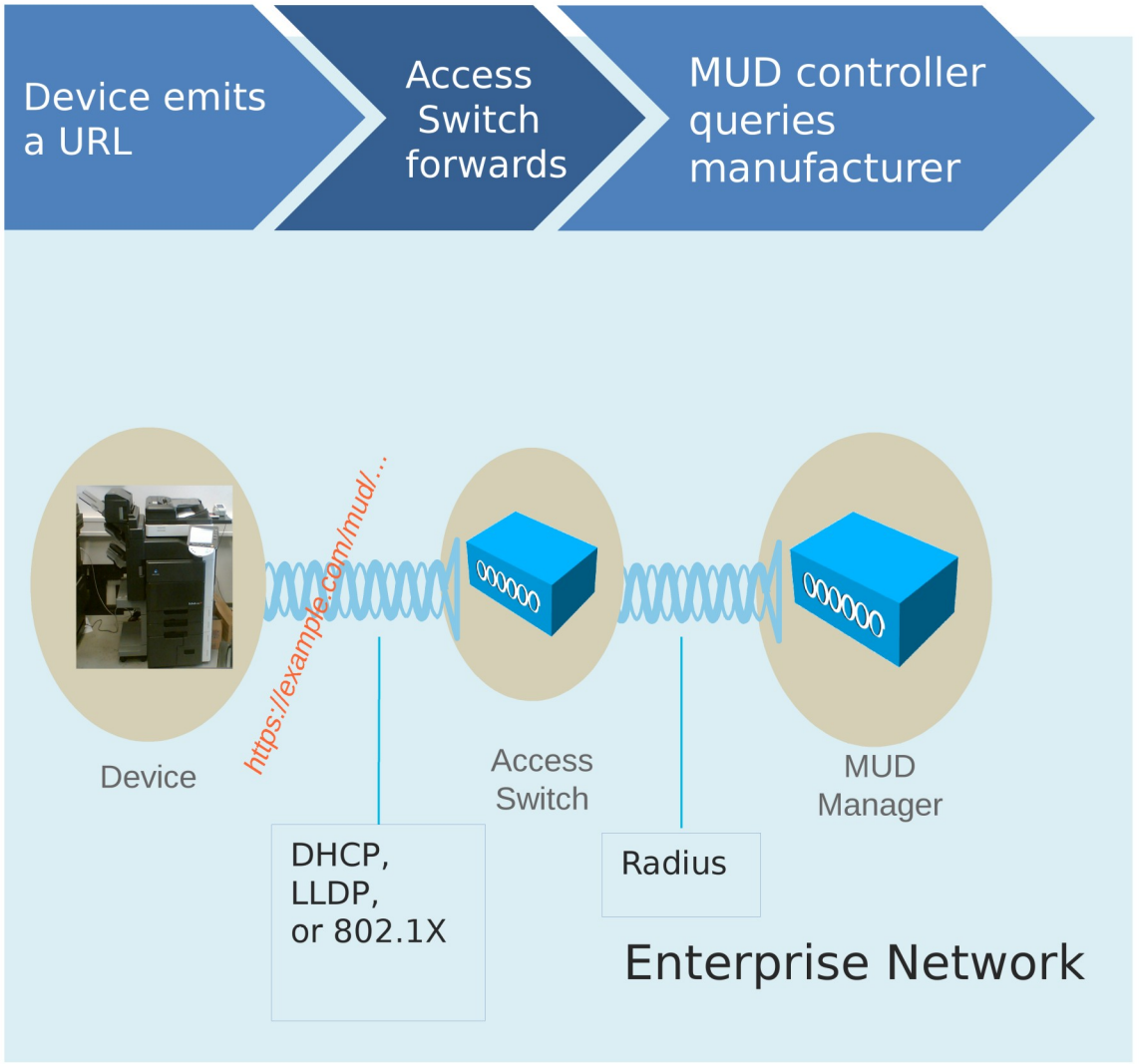

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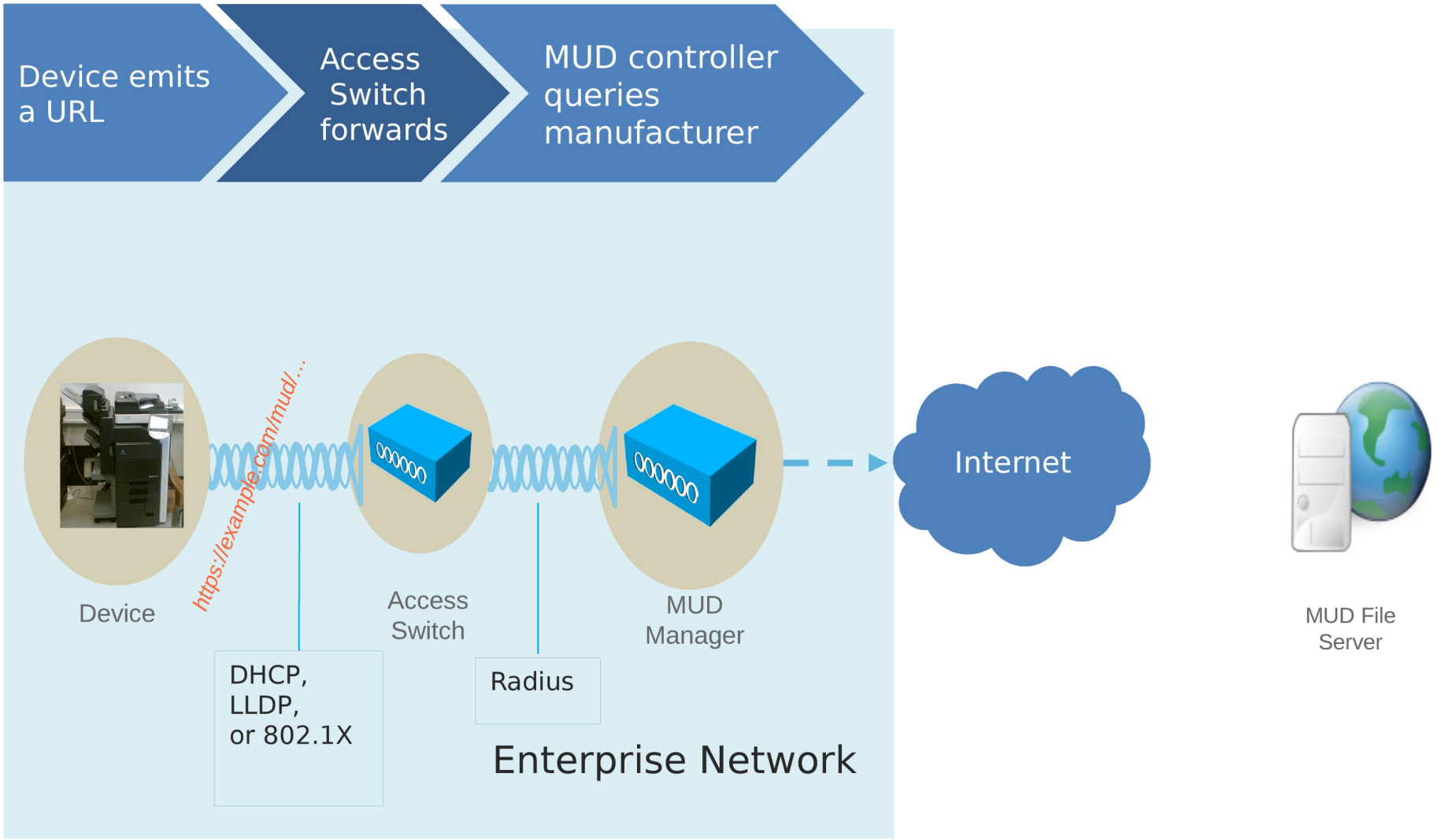

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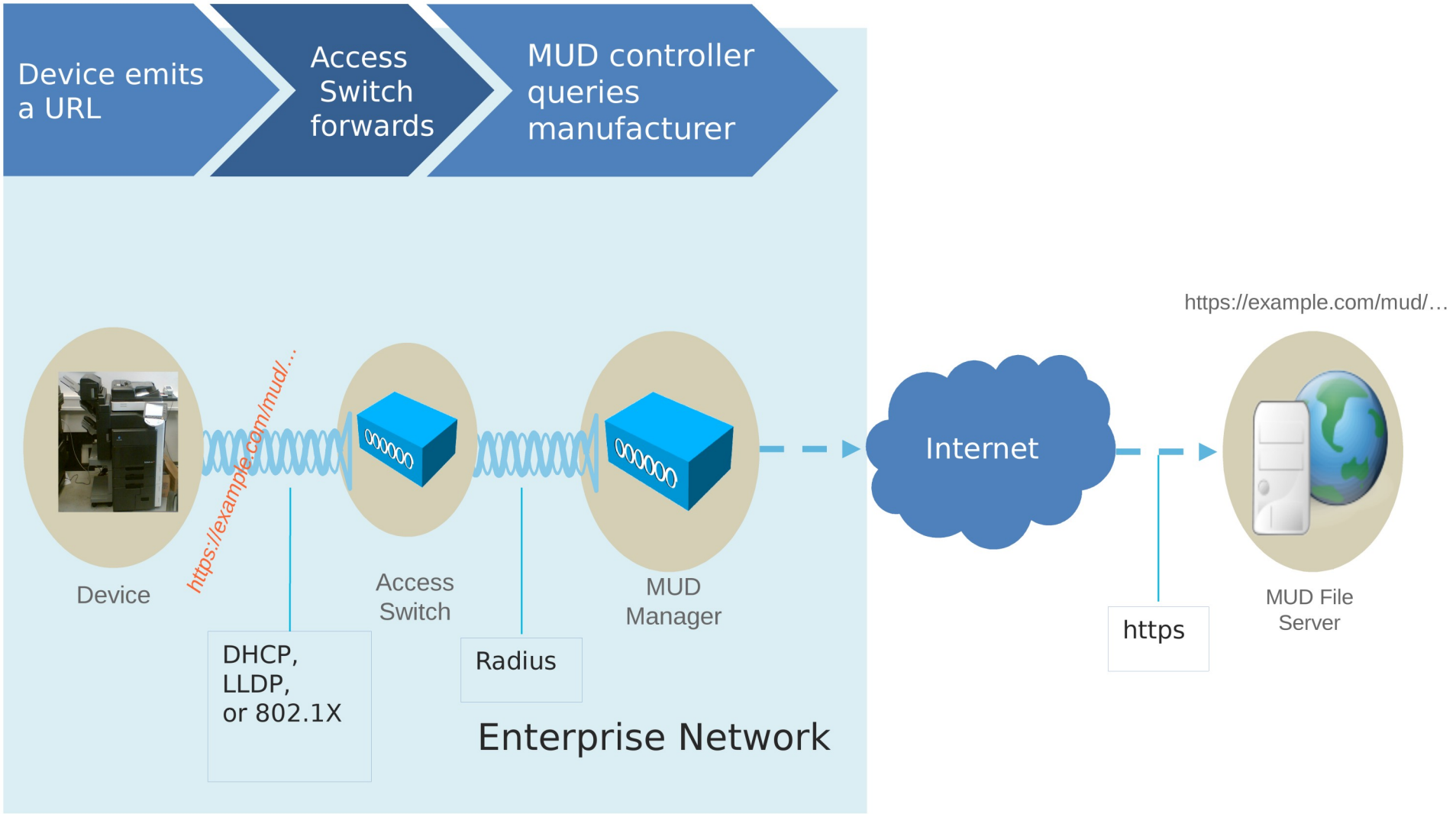

Getting from the MUD file to deployment config

```
... "acl": [
      {
       "name": "mud-76228-v4to",
       "type": "ipv4-acl-type",
       "aces": {
        "ace": [
         {
          "name": "myctl0-todev",
          "matches": {
           "ietf-mud:mud": {
            "my-controller": [
             null
            ]
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```

https://mudmaker.org

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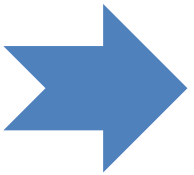

10.1.2.3
10.4.5.6

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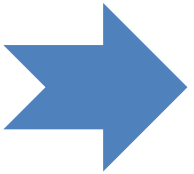
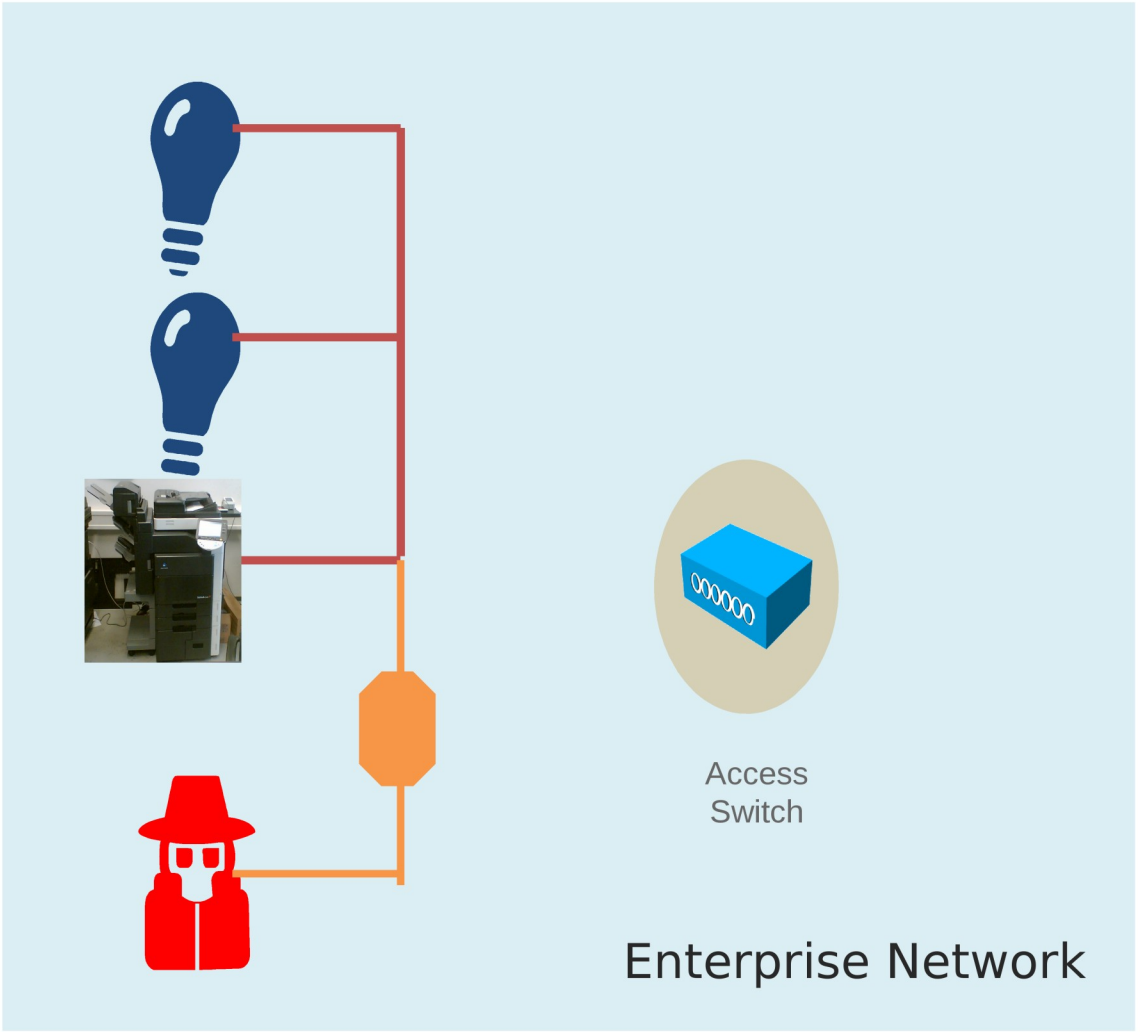


Whatever is appropriate in the local deployment.

10.1.2.3
10.4.5.6

https://mudmaker.org

Results: Micro-segmentation of that Thing



- Visibility of what's on the network
- Access limited to devices based on manufacturer recommendations
- Policy choices easily identified by MUD file
- Hacked devices can't probe for holes
- An additional layer of security
  - BUT- manufacturers should still **always** secure their devices

When not to use MUD

- Multi-purpose systems
- Systems where the software is from third parties
  - Uncooperative third parties
- Pretty much anything that is browser based, probably is too hard to describe