MADP
Multicast Address Discovery Protocol

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Agenda

- **Problem Statement**
- **MADP Goals**
- **MADP Basics**
- **MADP Details**
- **MADP Example**

Problem Statement

- Enterprise Networks wish to deploy Scoped Zones
  - Allows them to limit the scope of applications
    - Examples: Norton Ghost, Altiris
  - Many applications use “fixed” addresses
    - Often due to need for (near) zero-configuration operation
    - Some haven’t even bothered to register with IANA!!
      - Address Assignment by “Atmospheric Extraction”
  - Scope range maintenance becomes complex
    - Must make exceptions for these “rogue” applications
    - More and more such applications popping up
  - Need a way to achieve (near) zero-configuration and yet give network admin control of addresses used by apps

MADP Goal

- **Provide simple alternative to “hardcoding”**
  - **Flexible and yet super simple technique**
  - **Provide Publicly available code library**
    - **Make things as simple as an API call**
  - **Provide more flexible scoped application deployment in multicast networks**
  - **Take away all “excuses” to hardcode addresses**

MADP Basics

- **Multicast Address Discovery Protocol**
  - **Very light-weight**
  - **Assumes no support infrastructure other than:**
    - **IP Multicast**
    - **RFC 2365 Administratively Scoped Zones**
      - **Well-Known Scopes (Local & Org. Local Scopes)**
      - **Scope Relative Addresses**
  - **No dependence on 3rd party infrastructure**
    - **Runs entirely in Application Clients and Servers**

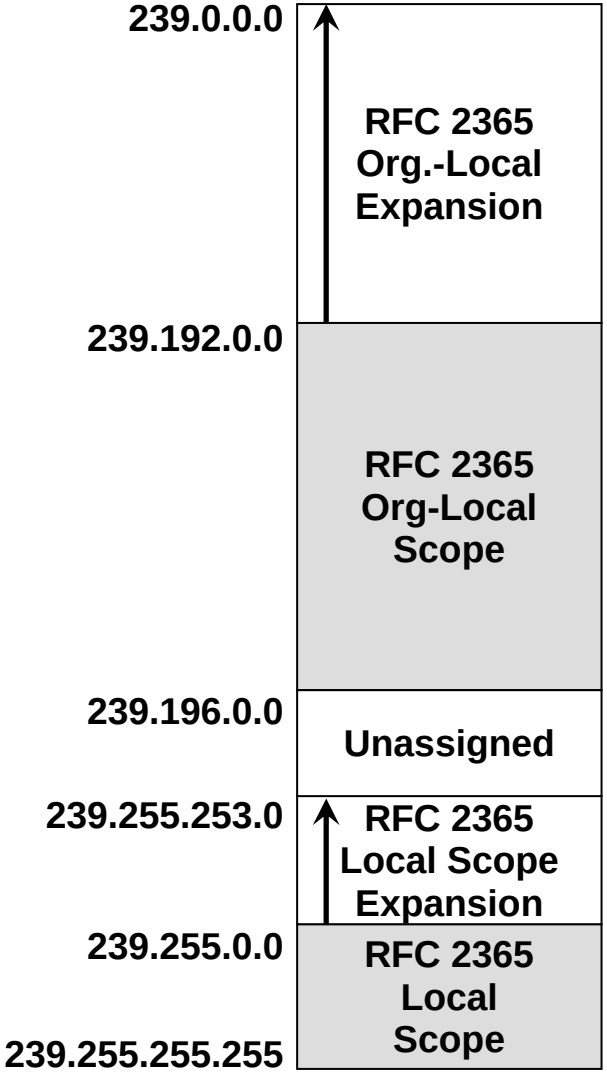
MADP Basics

- **Servers listen on Scope Relative Addresses**
  - **When a Request is received, they check to see if they are the Server for application “X”**
  - **If so, they send a Response containing multicast address information**
    - **Address information was preconfigured by network admin**

MADP Basics

- **Clients performs Expanding Ring Search**
  - **Link-Local -> Local Scope -> Org-Local Scope**
- **Send Requests on Scope Relative address**
  - **IPv4 Link-Local is special case using:**
    - **MADP Local Scope Relative Address and**
    - **TTL=1**
  - **Request info on what multicast address(es) application “X” is using**

RFC 2365 – Administratively Scoped Zones



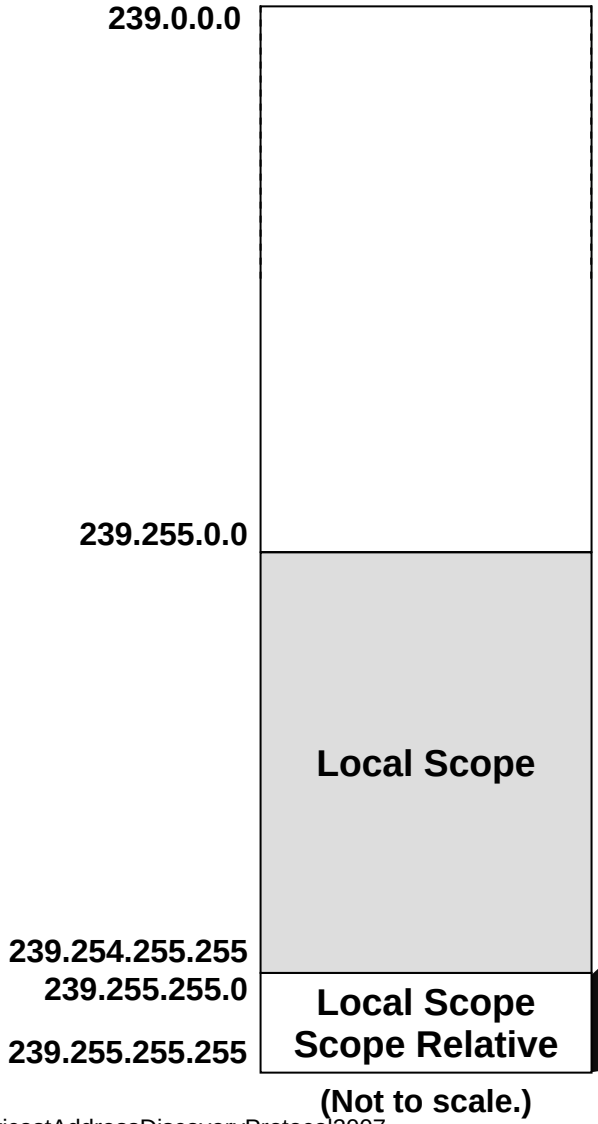
- Defines only 2 Well-Known Scopes
  - Organization-Local Scope (239.192/14)
    - Largest scope within the Enterprise network (i.e. entire Enterprise Network)
  - Local Scope (239.255/16)
    - Smallest possible scope within the Enterprise network
      - Other scopes may be equal to but not smaller in scope

IPv4 Scope Relative Addresses – RFC 2365

Top 256 Addresses of every Admin. Scope Range

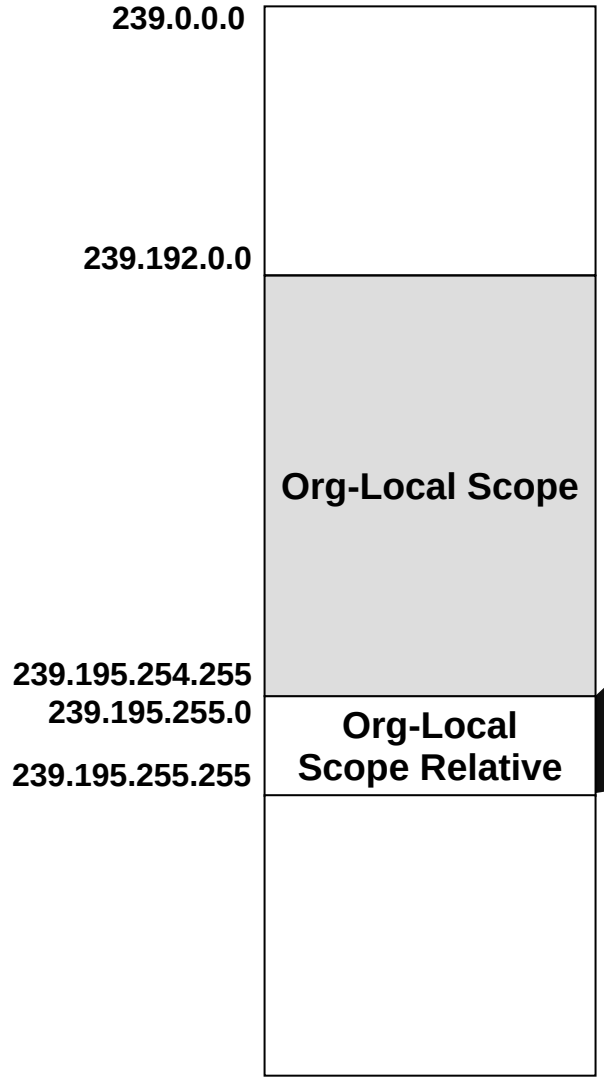
Last Octet	Offset	Description
.255	-0	SAP Session Announcement Protocol (SDR)
.254	-1	MADCAP Protocol
.253	-2	SLPv2 Protocol
.252	-3	MZAP Protocol
.251	-4	Multicast Discovery of DNS Services
.250	-5	SSDP
.249	-6	DHCPv4
.248	-7	AAP
.247	-8	MBUS
.246	-9	MADP (Example only: To be assigned by IANA)

IPv4 Scope Relative – Local Scope



Address	Description
239.255.255.255	SAP Session Announcement Protocol (SDR)
239.255.255.254	MADCAP Protocol
239.255.255.253	SLPv2 Protocol
239.255.255.252	MZAP Protocol
239.255.255.251	Multicast Discovery of DNS Services
239.255.255.250	SSDP
239.255.255.249	DHCPv4
239.255.255.248	AAP
239.255.255.247	MBUS
239.255.255.246	MADP (Example only: To be assigned)

IPv4 Scope Relative – Org-Local Scope



Address	Description
239.195.255.255	SAP Session Announcement Protocol (SDR)
239.195.255.254	MADCAP Protocol
239.195.255.253	SLPv2 Protocol
239.195.255.252	MZAP Protocol
239.195.255.251	Multicast Discovery of DNS Services
239.195.255.250	SSDP
239.195.255.249	DHCPv4
239.195.255.248	AAP
239.195.255.247	MBUS
239.195.255.246	MADP (Example only: To be assigned)

IPv6 MADP

- Operates in the same fashion
- Scope Addressing much easier
  - Uses Scope Bits in IPv6 address

Why not use existing protocols?

- DNS – Domain Name Service
- SAP – Service Announcement Protocol
- SLP – Service Location Protocol
- Other?

Reasons to not use DNS

- **DNS**
  - **Application is *still* dependent on external service (DNS Server, DNS Database) being configured before it can be deployed!**
    - ***NON-STARTER!***

Reason to not use SAP.

- SAP
  - Client could be swamped/flooded by SAP announcements for unwanted info
  - No way to request an announcement, so you have to send rapid announcements or wait for a long time
  - Parsing of SDP adds a lot of complexity
  - Overall SDP/SAP RFC size can scare off application developers
    - *“Man, I don’t have time to read all of that stuff”*
    - Remember: We want something super simple

Reasons to not use SLP

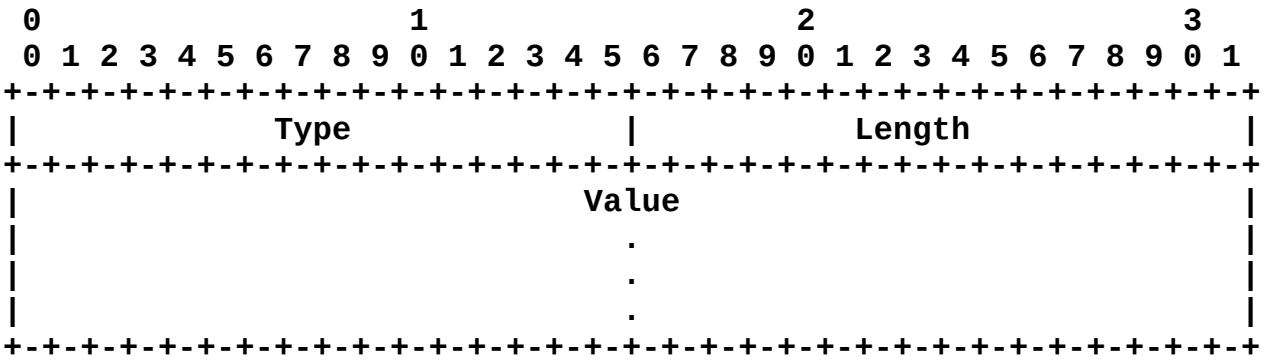
- **SLP**
  - **Too complex for what is required**
    - **Highly unlikely to be adopted by app developers**
  - **Application is *still* dependent on external service (SLP Server) being configured before it can be deployed!**
    - ***NON-STARTER!***

Reasons to not use other approaches

- **Other**
  - **In general, the application is *still* dependent on an external service being configured before it can be deployed!**
    - ***NON-STARTER!***

MADP Details

- **Packet Format**
  - **Sequence of TLV's**



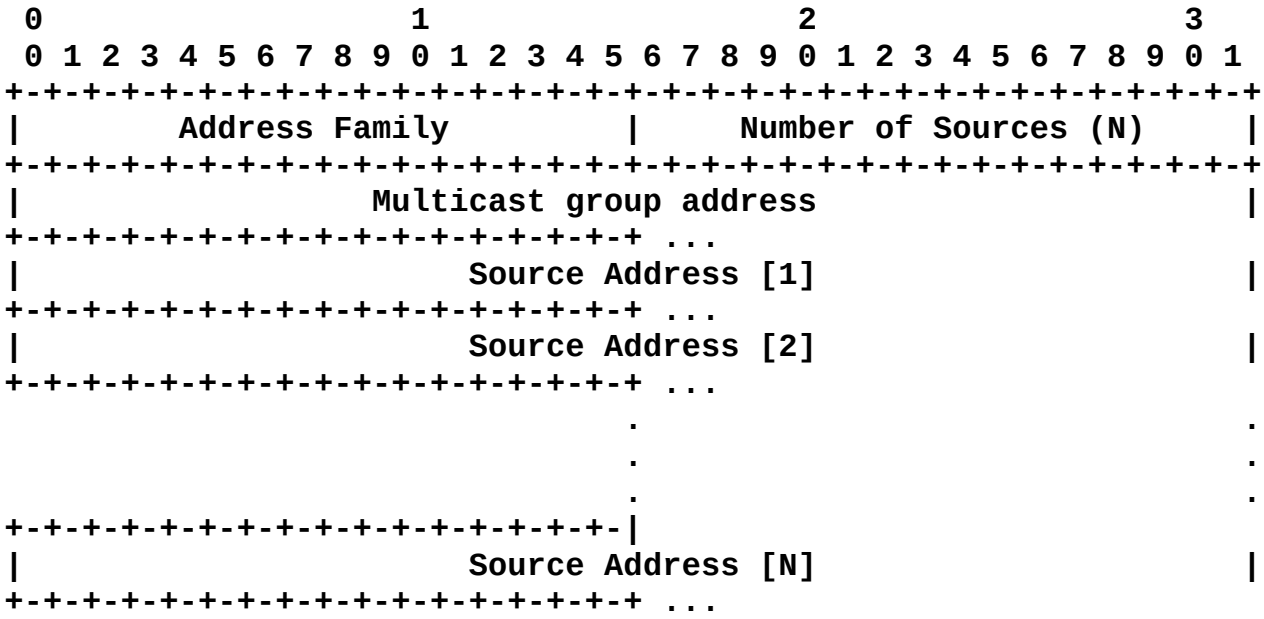
    - **Types: Specifies the type**
    - **Length: Specifies the length of the value field**
    - **Value: Must always be of the specified length**
      - **If length = 0, value field is not included**

MADP Details

- **Types**
  - **(0) Request: Indicates packet is a Request**
  - **(1) Response: Indicates packet is a Response**
  - **(2) Request Name: Uniquely identifies application**
  - **(3) Vendor Name/ID (opt): Further ID's application**
  - **(4) Client ID (opt): ID's Client**
  - **(5) Request ID (opt): ID's Request**
    - **If present in Request, returned in Response**
  - **(6) Multicast Group: Multicast Group Information**
    - **Used in Response only**
    - **May appear multiple times when more than one multicast address is in use by application**

MADP Details

- **Multicast Group Type Data (Value field)**

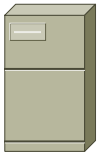


  - **Number of Srcs: Nonzero for SSM Support**
  - **Group Adr: Multicast Group Address**
  - **Source Address(es) (opt): Source Addresses**

MADP Example

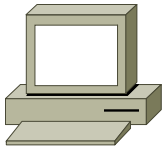
Application Foo uses 3 groups

App “Blah”
Server



Multicast

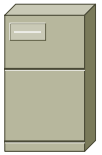
(0)Request
(2)Request Name: “App Foo”
(3)Vendor ID: “Mr. Bill’s Software”
(4)Client ID: “Bubba”
(5)Request ID: 0x0123



Request

App “Foo”
Client “Bubba”

App “Foo”
Server



MADP Example

Application Foo uses 3 groups

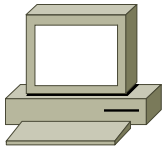
App “Blah”
Server

Ignored!

Request

Multicast

(0)Request
(2)Request Name: *“Foo”*
(3)Vendor ID: “Mr. Bill’s Software”
(4)Client ID: “Bubba”
(5)Request ID: 0x0123



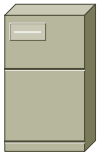
App “Foo”
Client “Bubba”

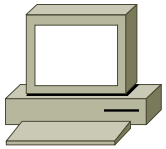
App “Foo”
Server

MADP Example

Application Foo uses 3 groups

App “Blah”
Server



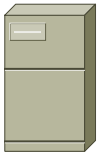


App “Foo”
Client “Bubba”

Multicast

(0)Request
(2)Request Name: *“Foo”*
(3)Vendor ID: “Mr. Bill’s Software”
(4)Client ID: “Bubba”
(5)Request ID: 0x0123

App “Foo”
Server



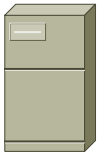
Request

Match

MADP Example

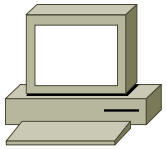
Application Foo uses 3 groups

App “Blah”
Server



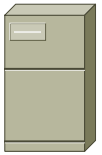
Unicast

(1)Response
(2)Request Name: “Foo”
(3)Vendor ID: “Mr. Bill’s Software”
(4)Client ID: “Bubba”
(5)Request ID: 0x0123
(6)Multicast Group: 239.225.100.1
(6)Multicast Group: 239.225.200.1
(6)Multicast Group: 239.225.200.2



App “Foo”
Client “Bubba”

App “Foo”
Server



Reply

Discussion?

Assuming you didn’t speak up already. ;-)