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Dynamic Host Configuration Protocol for IPv6

- draft-ietf-dhc-dhcpv6-28.txt (currently with RFC-Editor)
- Similar to DHCPv4, but
  - Supports IPv6 addressing and configuration needs
  - Is the “stateful” auto-configuration protocol for IPv6 (“M” bit)
  - Is the “other” (non-address) configuration protocol for IPv6 (“0” bit)
  - Clean design
    - New optimized packet format (no BOOTP legacy)
    - 16-bit option space, 16-bit option lengths
    - Uses encapsulation (some messages/options encapsulate others)
  - Client may obtain many addresses (not just one)

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IPv6 Concepts

- IPv6 auto-configuration
  - Stateless - nodes configure addresses themselves with information from routers (if available); no managed addresses
  - Stateful - nodes use DHCPv6 to obtain addresses and more
  - These are not mutually exclusive!
  - Duplicate address detection (DAD) used to avoid duplicated addresses
- Link-local address always available
  - A node always creates a link-local address (stateless)
  - Allows for direct communication between nodes on a link
  - DHCPv6 client therefore has an address it can use

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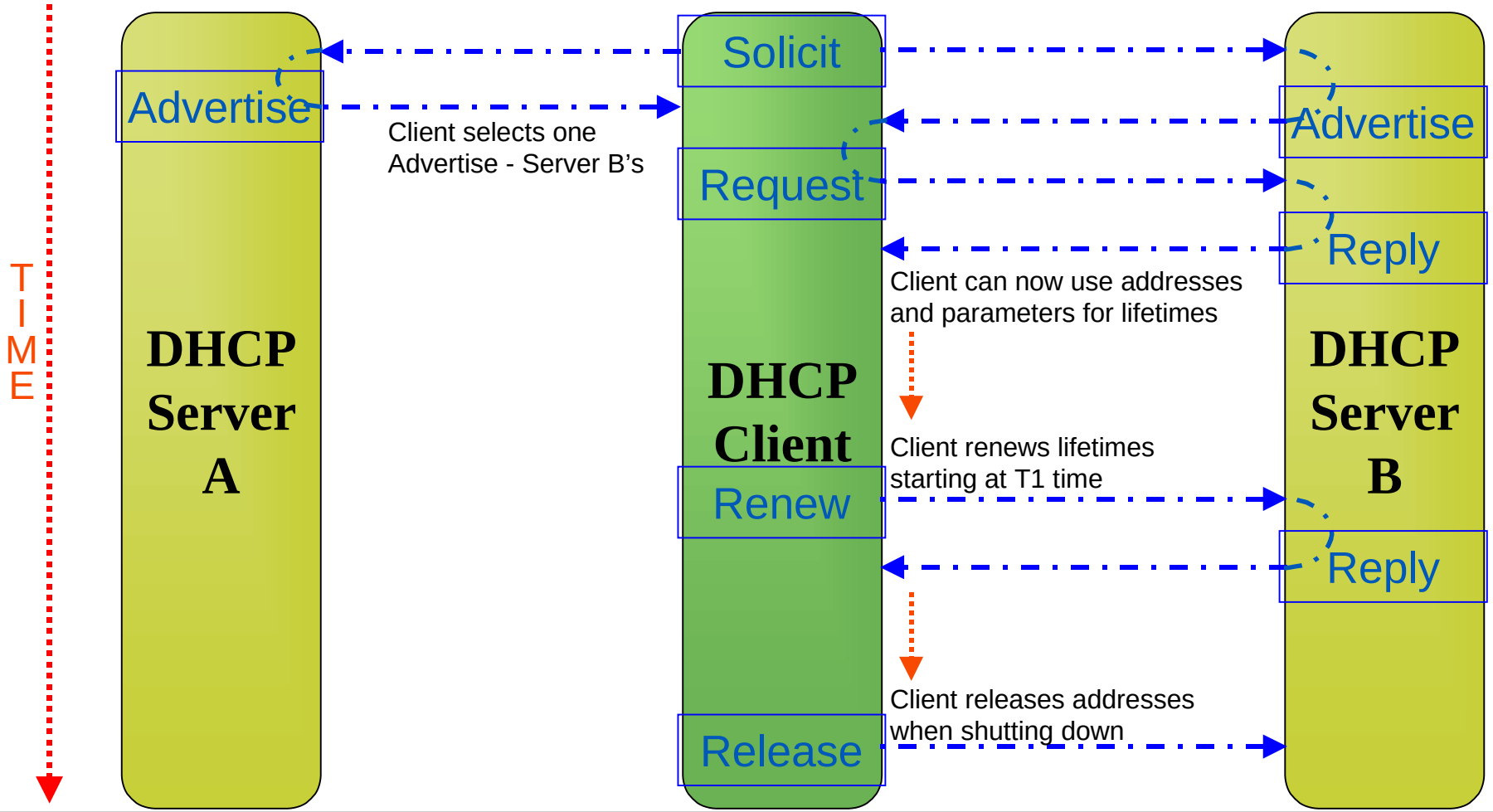
IPv6 Concepts

- IPv6 addresses have preferred & valid lifetimes
  - Preferred means address may be used to *initiate* communications
  - Valid means address is *usable* for communications (for existing connections or for pending queries)
  - After valid lifetime expires, *address is no longer usable*
- For stateless addresses, routers update lifetimes
- For stateful addresses, DHCPv6 server updates lifetimes (similar to DHCPv4 lease extension)

DHCPv6 Operation



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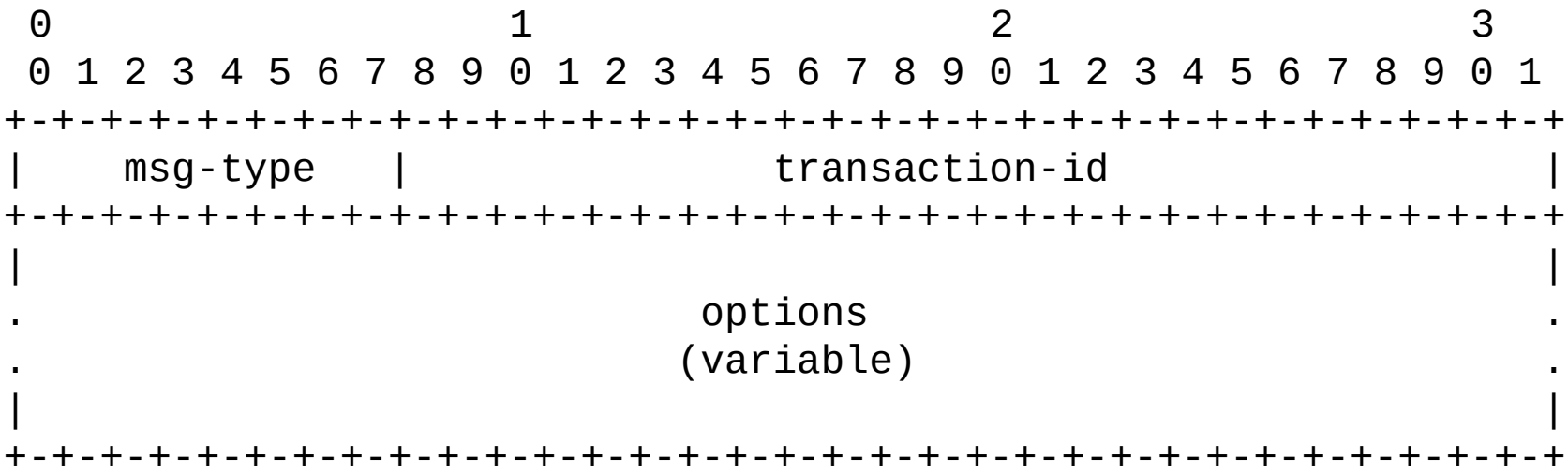
More on DHCPv6

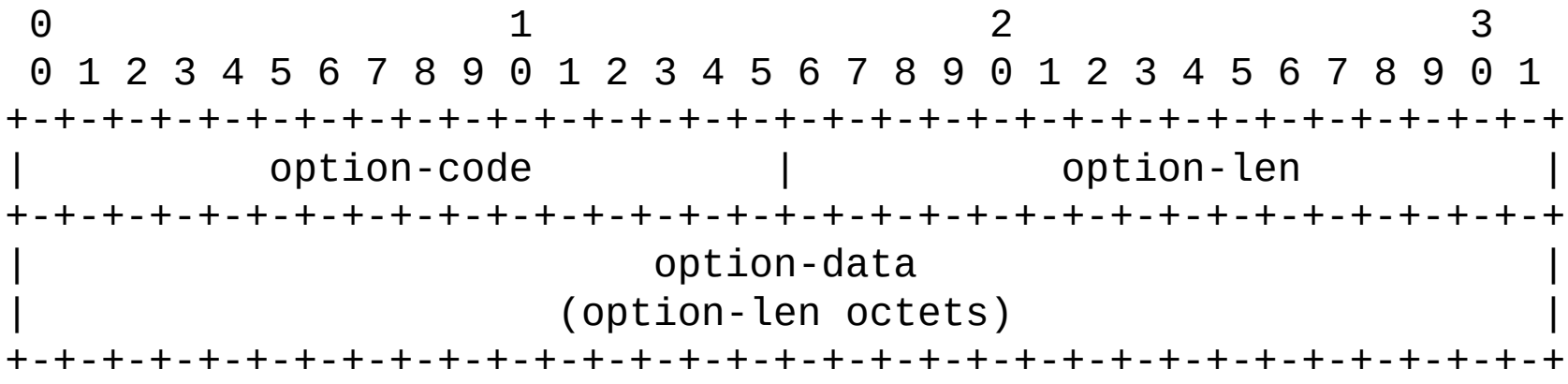
- Client sends messages to link-local multicast address
- Server unicasts response to client
- Information-Request / Reply - provide client configuration information but no addresses
- Confirm / Reply - assist in determining whether client moved
- Reconfigure - allow servers to initiate a client reconfiguration
- Basic client/server authentication capabilities in base standard
- DHCP Unique Identifier (DUID) used to identify clients & servers
- Identity Association ID (IAID) used to identify a collection of addresses
- Relay Agents used when server not on-link
- Relay Agents may be chained

DHCPv6 Basic Message Format



- SOLICIT
- ADVERTISE
- REQUEST
- CONFIRM
- RENEW
- REBIND
- REPLY
- RELEASE
- DECLINE
- RECONFIGURE
- INFORMATION-REQUEST
- RELAY-FORW
- RELAY-REPL

DHCPv6 Option Format & Base Options



- Client Identifier
- Server Identifier
- Identity Association for Non-temporary Addresses
- Identity Association for Temporary Addresses
- IA Address
- Option Request
- Preference
- Elapsed Time
- Relay Message
- Authentication
- Server Unicast
- Status Code
- Rapid Commit
- User Class
- Vendor Class
- Vendor-specific Information
- Interface-Id
- Reconfigure Message
- Reconfigure Accept