

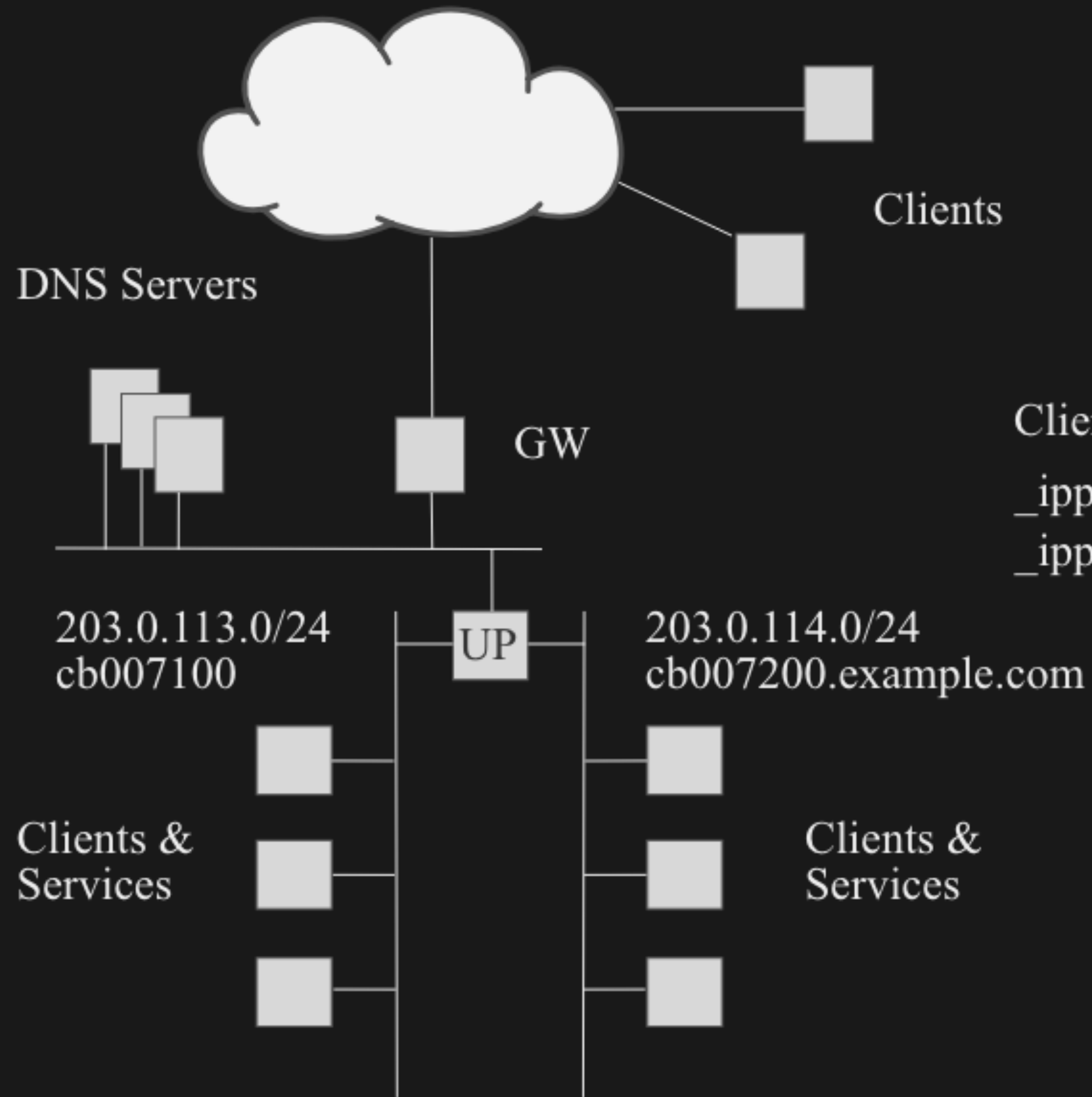
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**UPDATE PROXY**

# REFRESH



Client query:

b.\_dns-sd.\_udp.example.com. PTR

Response:

cb007100.example.com  
cb007200.example.com

Client queries:

\_ipp.\_tcp.cb007100.example.com. PTR  
\_ipp.\_tcp.cb007100.example.com. PTR

## UNICAST SERVICE DISCOVERY

- ▶ Reduce DNS Update to trusted infrastructure
- ▶ Announcements proxied through UPDATE to authoritative servers
  - ▶ uses existing authoritative servers with IP subnet-to-subdomain model
  - ▶ subdomains can be created on demand minimizing configuration
- ▶ Transparent to clients making unicast queries to browseable domains
- ▶ Transition from multicast to unicast independently

## OVERVIEW

- ▶ Map IP subnet to subdomain, ensure authoritative server accepts UPDATES
- ▶ Passively monitor mDNS announcements, send UPDATES
- ▶ Refresh via unicast "QU", delete upon receiving "goodbye" announcements
- ▶ Periodically send query for `_services._dns-sd._udp.local` on active IP subnets
- ▶ May include TIMEOUT resource records to have authoritative server remove services or include OPT Lease Update Lifetime in UPDATE.

## DISCOVERING SUBDOMAIN

- ▶ Address derived domain enumeration using local resolver
  - ▶ dr.\_dns-sd.\_udp.0.113.0.203.in-addr.arpa.
  - ▶ response: [bldg7a.example.com](http://bldg7a.example.com).
- ▶ Fall back to local configuration or...
- ▶ algorithmic subdomain label generation
  - ▶ 203.0.113.0/24 becomes
  - ▶ [cb007100.example.com](http://cb007100.example.com).
  - ▶ Once created, proxy creates 0.113.0.203.in-addr.arpa.

## UNICAST TRANSITION

- ▶ Clients may query `_dns-updateproxy-tls._tcp.<ip-subnet>.in-addr.arpa` via unicast to find Update proxy.
- ▶ Make TLS connection to target, port and begin sending unicast announcements

## COMPARISON TO DISCOVERY PROXY

	Discovery Proxy	Update Proxy
State	on demand	all services
Response Time	cache dependent	immediate
IP multicast increase	$O(n^2)$	$O(1)$
unicast increase	none	$O(n^2)$
DNSSEC	NSEC not possible	NSEC works
Complexity	Authoritative + full mDNS + relay	passive mDNS + UPDATE xmit

## OUTSTANDING ISSUES

- ▶ Verify creation of all necessary records for client browsing are documented
- ▶ Verify subdomain cleanup after failover
- ▶ Discuss registration of services in multiple subdomains, dr vs. r
- ▶ PUSH subscriptions to unicast authoritative



# IMPLEMENTATIONS

- ▶ rupdateproxy - <https://github.com/pusateri/rupdateproxy>
  - ▶ Listens to mDNS announcements and builds local cache
  - ▶ Creates UPDATES for new cache entries to send to authoritative
  - ▶ TODO:
    - ▶ UPDATES with TSIG and TCP, TLS
    - ▶ Subdomain discovery and registration
    - ▶ dynamic interface support
    - ▶ Integration with switch/router platform for deployment