```
; <<>> DiG 9.3.6-P1-RedHat-9.3.6-25.P1.el5_11.10 <<>> NS uwaterloo.ca
;; global options:  printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 5943
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 0


;; QUESTION SECTION:
;uwaterloo.ca.                   IN      NS

;; ANSWER SECTION:
uwaterloo.ca.           8738    IN      NS      cn-dns-mc.uwaterloo.ca.
uwaterloo.ca.           8738    IN      NS      ext-ipam-yyz.uwaterloo.ca.
uwaterloo.ca.           8738    IN      NS      cn-dns-rac.uwaterloo.ca.


;; Query time: 1 msec
;; SERVER: 129.97.2.1#53(129.97.2.1)
```

DNS Subzone Guideline

Why / What / When / How

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Before We Begin: Definitions

- Domain name: generally, a mapping of a string to an IP address
- Sub-domain: a single domain that is part of a parent domain, or a container for domain names
- Zone: a container for DNS records
- Sub-zone: a container for DNS records that are part of a parent zone
- Hostname: the unqualified name of an endpoint

- The focus of guideline is sub-zones

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DNS hierarchy and the UWATERLOO.CA Zone
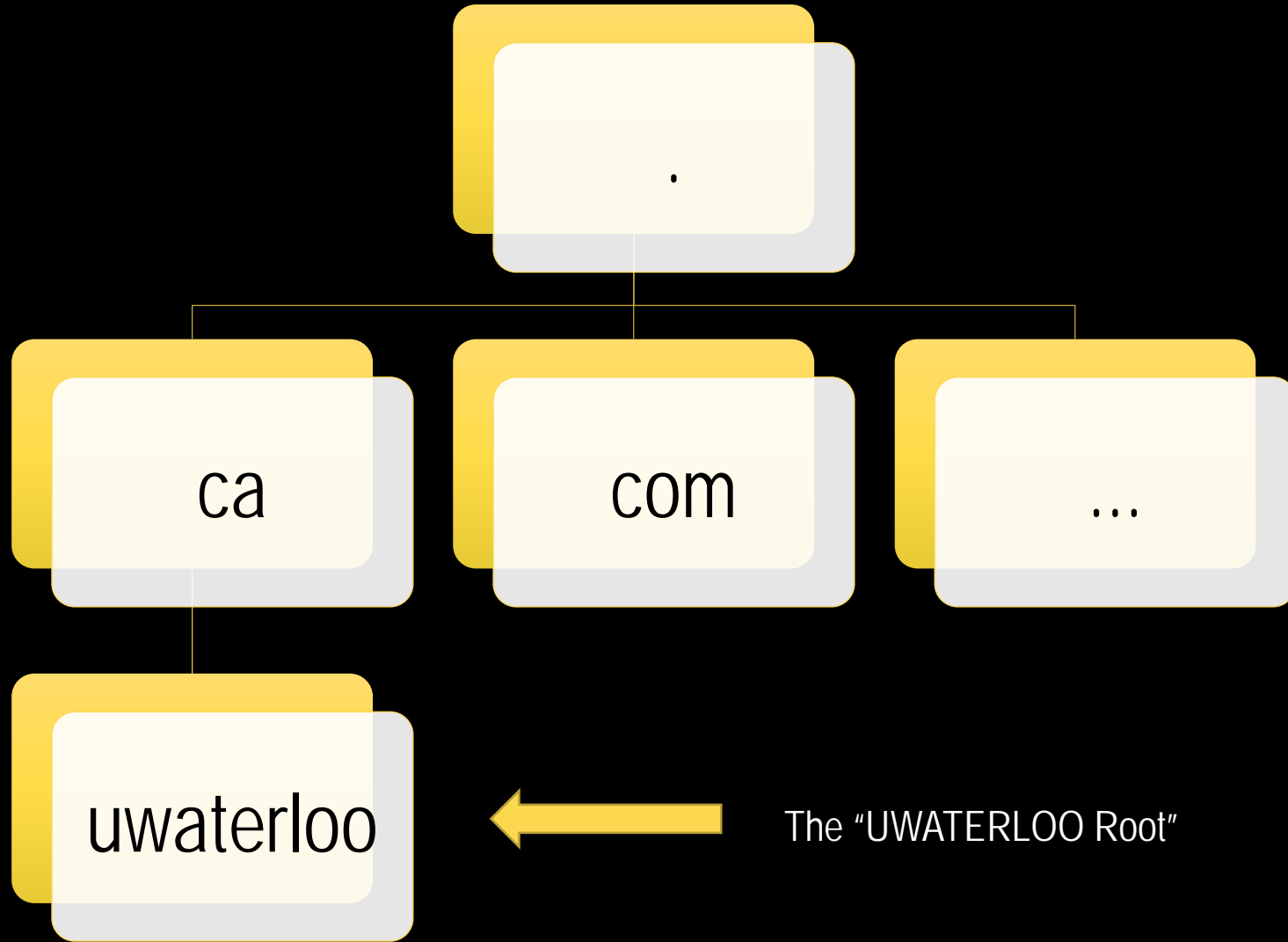
Dotted hostnames

- Recent uptick in tickets requesting DNS records for hostnames which include dots
  - eg. my.host in the zone .uwaterloo.ca

- Why?
  - Machine grouping
    - host1.ist.uwaterloo.ca
    - host2.ist.uwaterloo.ca

  - Vanity
    - dave.workstation.uwaterloo.ca
    - dave.laptop.uwaterloo.ca

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Record Overlap

- There is a zone .dave.uwaterloo.ca
  - There is an A record such that host1 -> 127.0.0.1

- There is a zone .uwaterloo.ca
  - There is an A record such that host1.dave -> 127.0.0.2

- Both records exist in the zone .dave.uwaterloo.ca
  - Most likely not the intended outcome

- Which record will I get? Both!

```
$ dig A host1.dave.uwaterloo.ca @cn-dns-mc +short
127.0.0.2
127.0.0.1
```

What if the zone isn't defined?

- In the zone .uwaterloo.ca there is an A record:
  - host1.dave2 -> 127.0.0.3

- Does the record get placed in the zone .dave2.uwaterloo.ca like in the previous example?
  - No, it exists in the .uwaterloo.ca zone

- The zone .dave2.uwaterloo.ca doesn't exist, so how do we have host1 there?
  - By breaking DNS RFC

- How can we avoid breaking RFC, creating overlapping records, and general inconsistencies in DNS?

Sub-zones for groups!

- By request, groups can have their own sub-zone in DNS
  - Reliable: consistent behavior
  - Scalable: easy to extend
  - Robust: RFC compliant

  - Host grouping
 - Some level of vanity

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The Sub-zone Guideline

- Each of the following groups can request one (1) sub-zone of uwaterloo.ca:
  - A faculty
  - An official school
  - An affiliated and federated institution of the University of Waterloo
  - Research centers and institutes

  - Groups defined by: https://uwaterloo.ca/faculties-academics

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The Sub-zone Guideline

- The requested sub-zone is called a 3rd level zone.
  - eg: <assigned-zone>.uwaterloo.ca

- Zone names must be reasonable in nature and reflect the requesting unit
  - A unit must have a reasonable claim to the name being requested
  - Name disputes will be subject to the recommendations of the Web Advisory Committee
    - (https://uwaterloo.ca/web-advisory-committee/projects/domain-name-resolution-subcommittee)

- All units can request multiple sub-zones within an assigned 3rd level zone.
  - eg. <department-zone>.<assigned-zone>.uwaterloo.ca
 - Approval from the owner of the third-level zone is required

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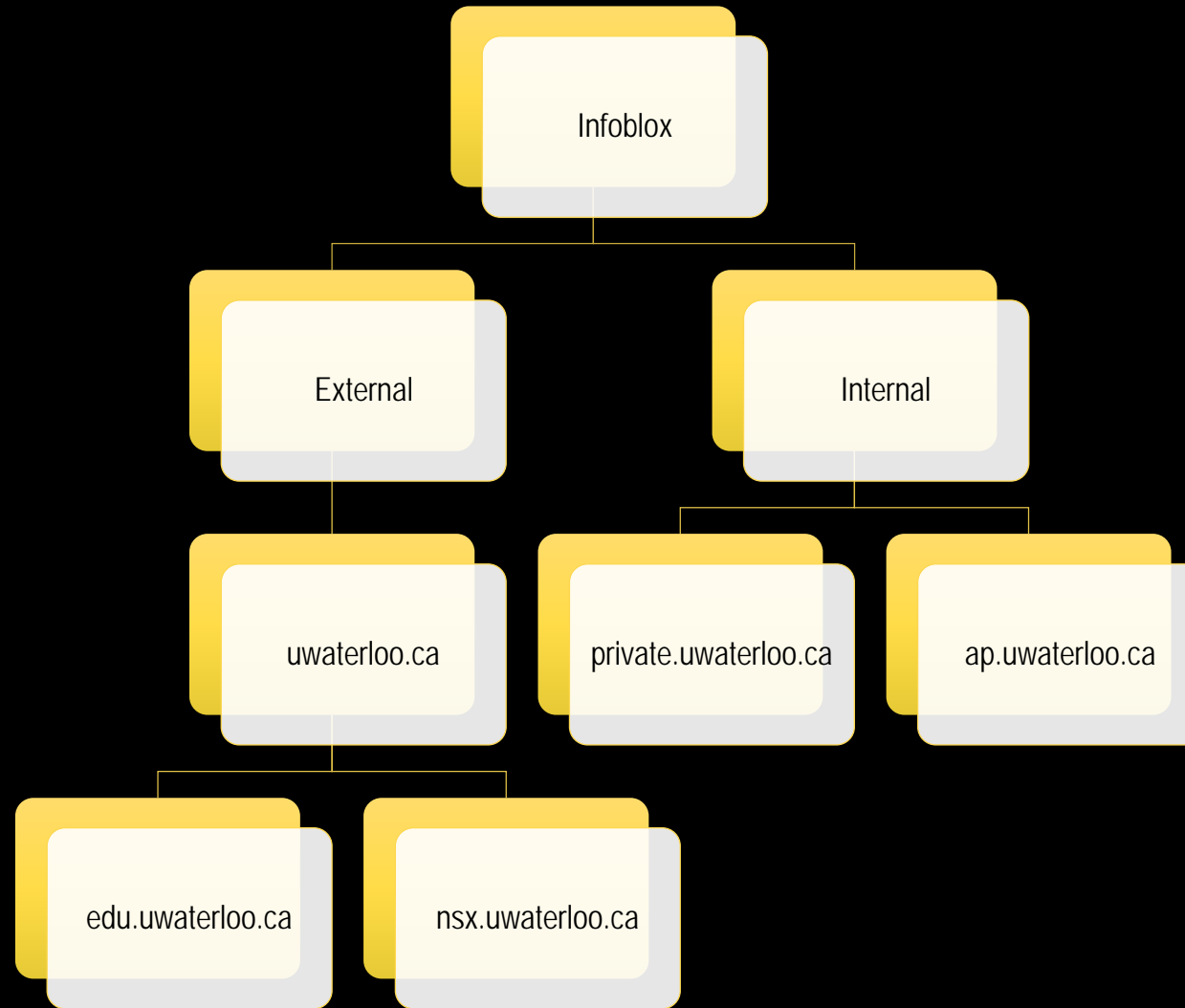
DNS Views

The Sub-zone Guideline: Record Management

- Records associated with globally routable IP addresses will be contained in the "External" DNS view

- Records associated with locally scoped IP addresses will be contained in the "Internal" DNS view in a fourth-level zone
  - eg. <private-zone>.<assigned-zone>.uwaterloo.ca

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DNS Views
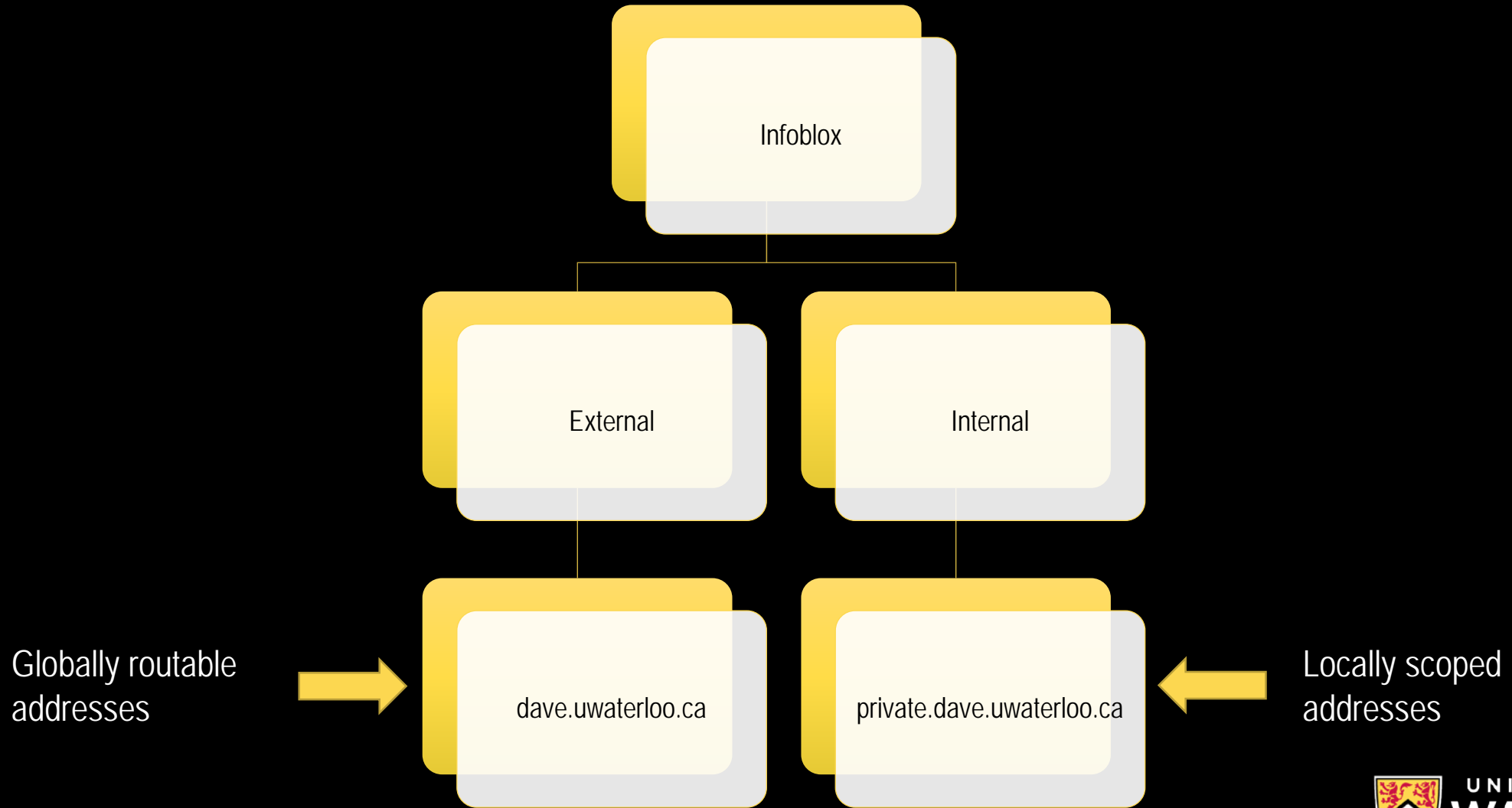
When / How?

- Available now with an RT to IST-hostmaster
  - Direct email: <u>rt-ist-hostmaster@rt.uwaterloo.ca</u>