

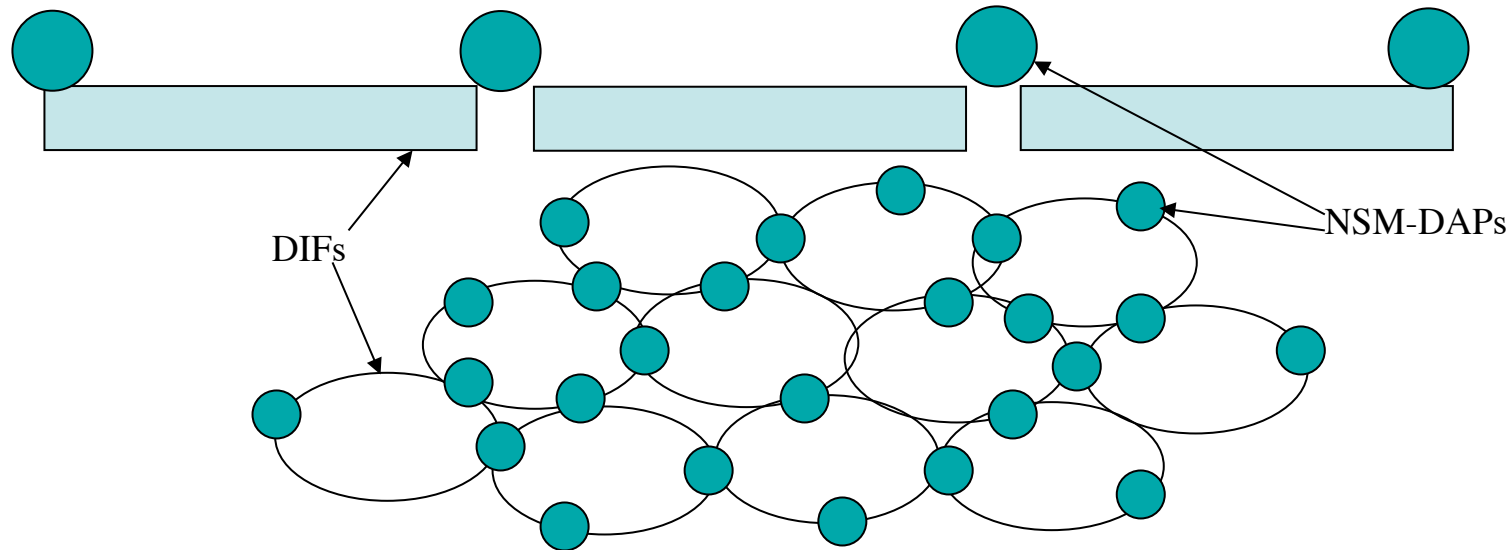
DAFs and Management in RINA

IRATI Workshop
Barcelona, Spain
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Name Space Management DMSs



Name Space Management (NSM)

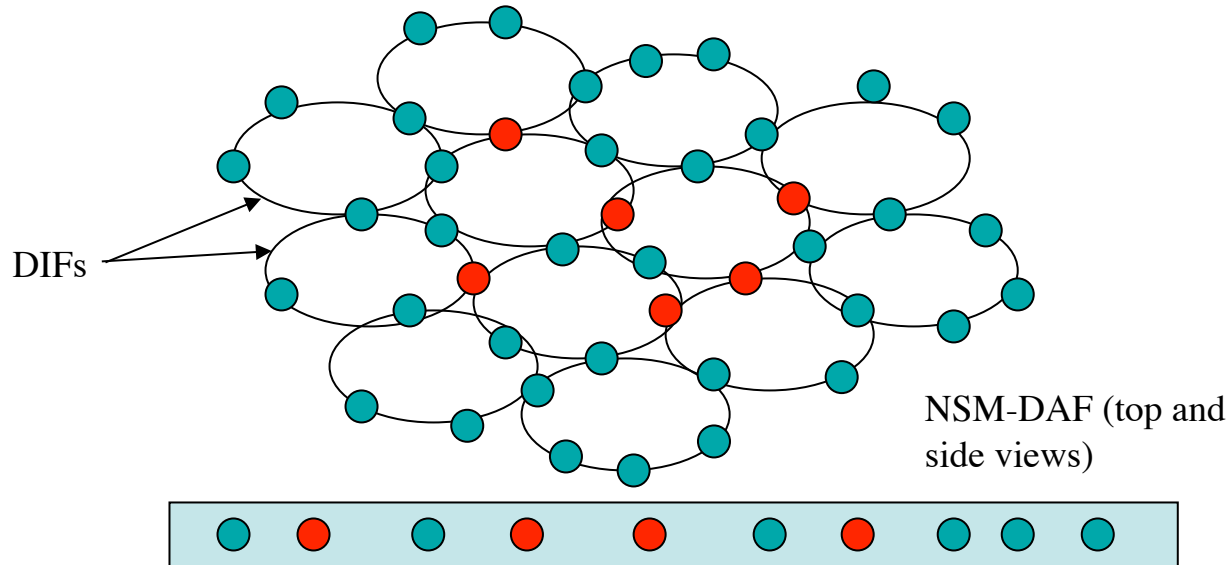


- The IPC Model posits a function that allows the Application Name Space to have a greater scope than any one DIF.
 - Which we have called the Inter-DIF Directory (for lack of a better term)
 - Entity associated with the IPC Management in DAPs may query what applications are available in a system.
 - This forms a graph where the nodes are NSM-DAPs and the arcs are DIFs

NSM-DSMs

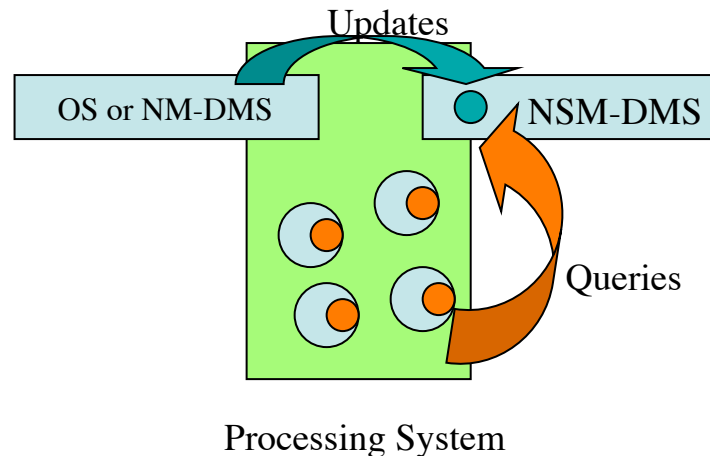
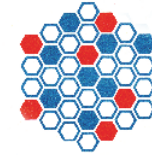
- Considering this a Name Space Management DMS reveals the functions:
 - Authenticate applications that are allowed to query the NSM-DMS
 - Authenticate and authorize entities that are allowed to update or modify the NSM-DMS.
 - Implement the policies for updating and replicating data to meet load and reliability requirements, including creating forwarding tables.
 - Check credentials of a request to determine requestor has access to the requested DAF and if so, return a list of DIFs and supporting DIFs.
 - Manage the name space, determine who gets assigned what.
 - Manage the creation of a common DIF between the requesting and requested DAPs.

NSM-DSMs



- For an environment of significant size, we can expect that information on available applications will be organized to shorten search time.
 - Hence some NSM-DAPs will contain only local information: ●
 - While others will be repositories for aggregate information: ●
 - The repositories might be organized by a hierarchy, DHTs, the Dewey Decimal System, etc.
 - This implies two kinds of forwarding tables:
 - Find the next repository, either aggregate or local. ●
 - Forward among NSM-DAPs to get to those repositories. ● ●

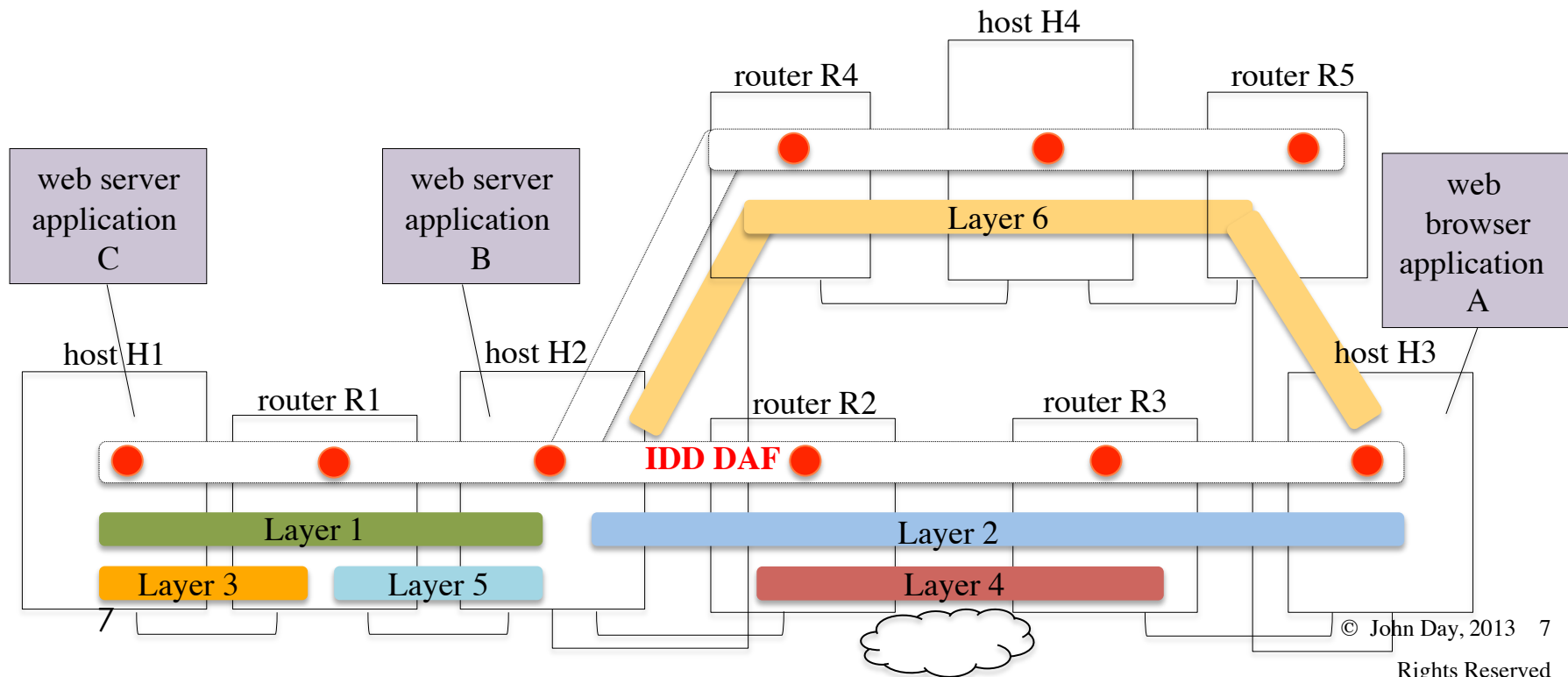
NSM-DMSs



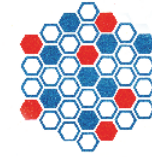
- Clearly there is a potential scaling problem here, if we are not careful.
- For large systems, a management system (either an OS-DMS or NM-DMS) will be responsible for access control domains.
 - These DMSs will be authorized to update or modify information aggregated with a NSM-DMS, will provide the local NSM-DAP, and participate in creating or joining new DIFs.
 - Everything else will be a NSM-client only, i.e. can only submit queries.
 - May not be considered a member of the NSM-DAF or a lesser member.
- For small systems, it degenerates into the DAF structure.

Discovery of the application

- ▶ Forwarding of the request between the peer IDDs until the destination application is found or the pre-defined termination condition is met



IDD Information



- Naming / synonyms
- Neighbor Table
- Search Table
- Directory

Naming Information

IDD Application Process Name
synonyms (optional)

Search Table

Application Process Name	List of Peer IDDs Application Process Names
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Neighbor Table

Peer IDD Application Process Name	List of Peers IDDs Application Process Names
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Directory

Application Process { Name, Access Control Information }
List of supporting DIFs { Name, Access Control Information, supported QoS }

What does the IDD request look like?

- A CDAP Read Request for an IDD-Record

IDD-Request

requested-Application-Process-Naming-Information

requesting-Application-Process-Access Control Information,

QoS parameters

- The CDAP Read Request can be encapsulated in an A-Unit-Data

A-Unit-Data

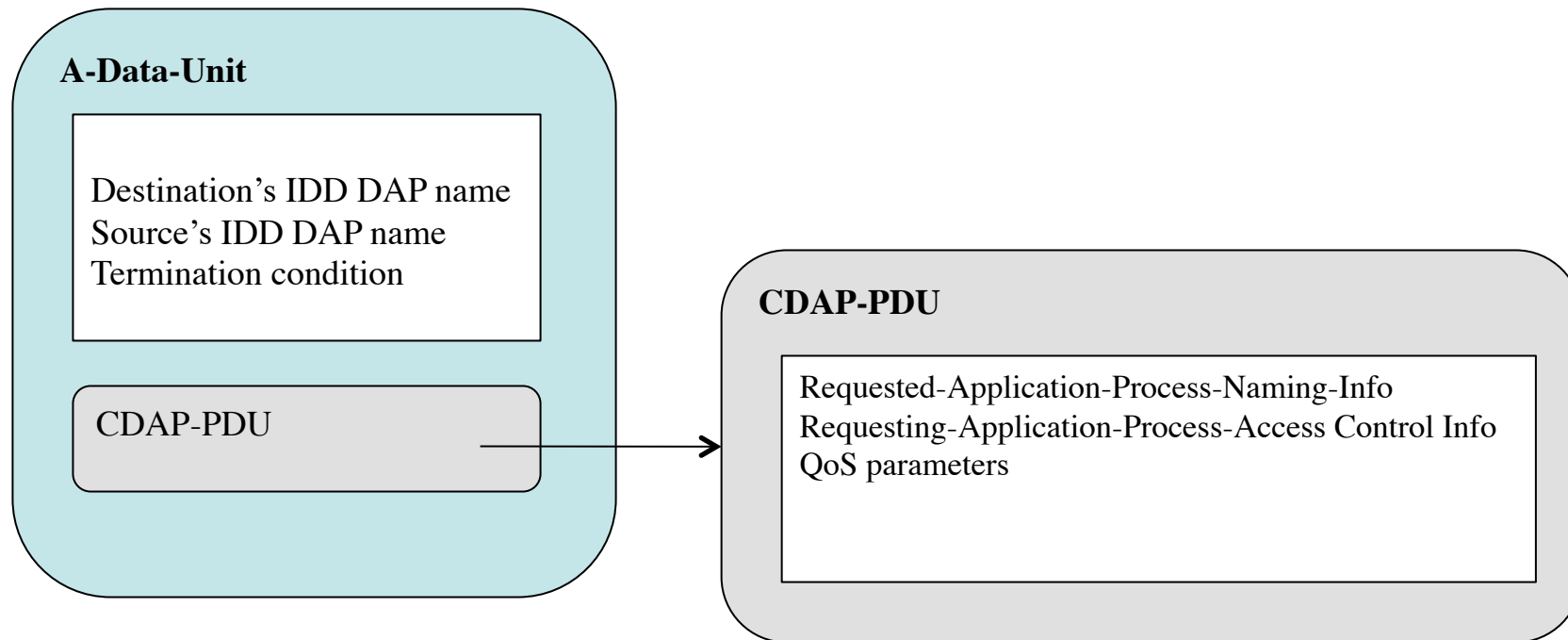
destination's IDD DAP name

source's IDD DAP name

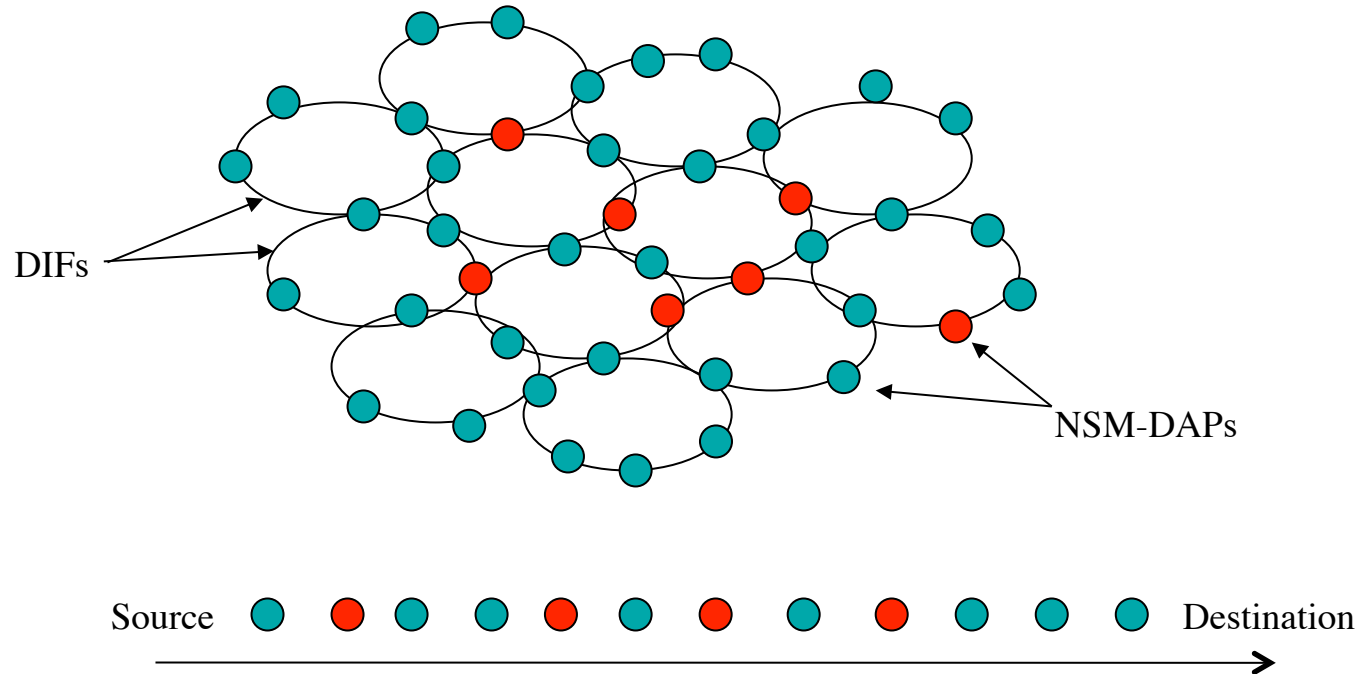
termination condition (e.g. hop count)

CDAP-PDU

How is it forwarded?



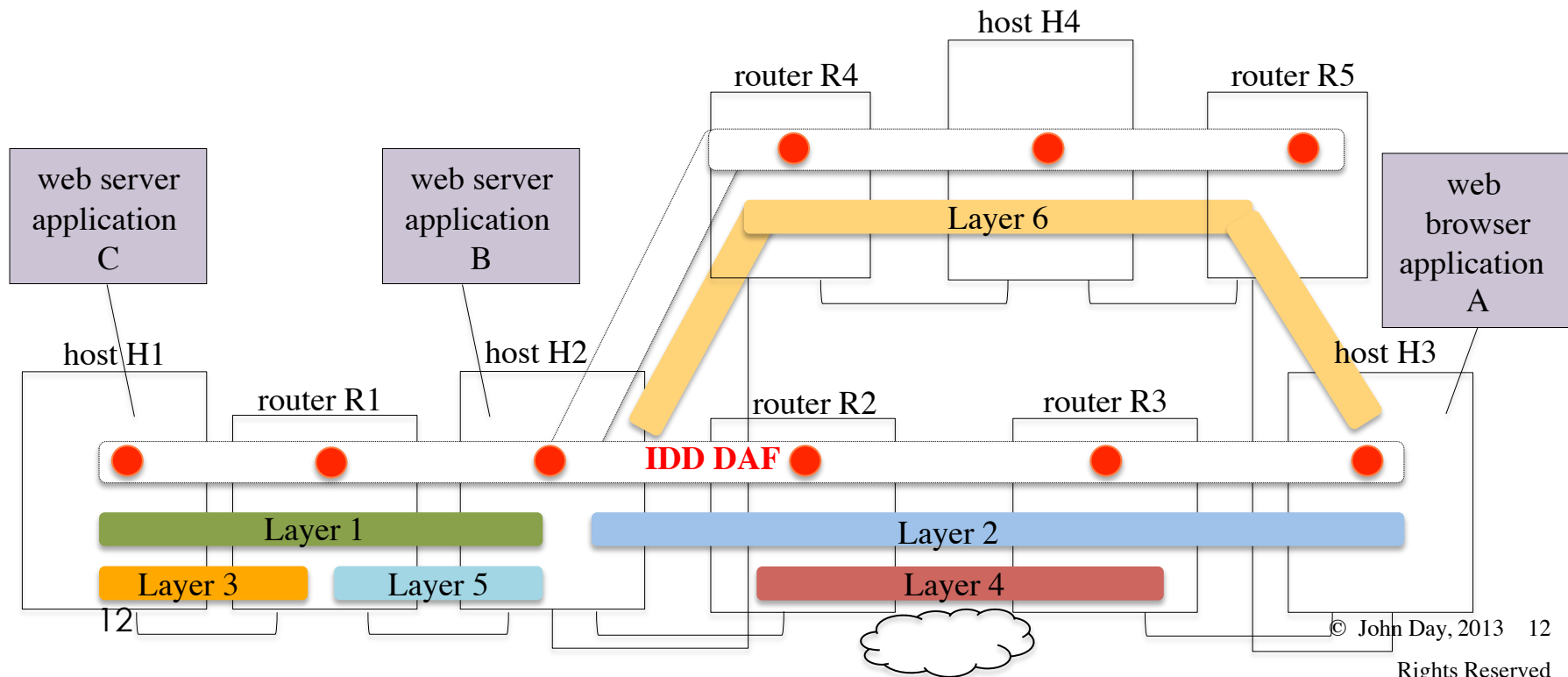
How is it forwarded?



- From any DAP to the other you forward A-Data-Units
- In the first, the last and all the red DAPs you process the CDAP PDU
- Only in the destination IDD DAP (last one) you do a CDAP Read for an IDD-Record

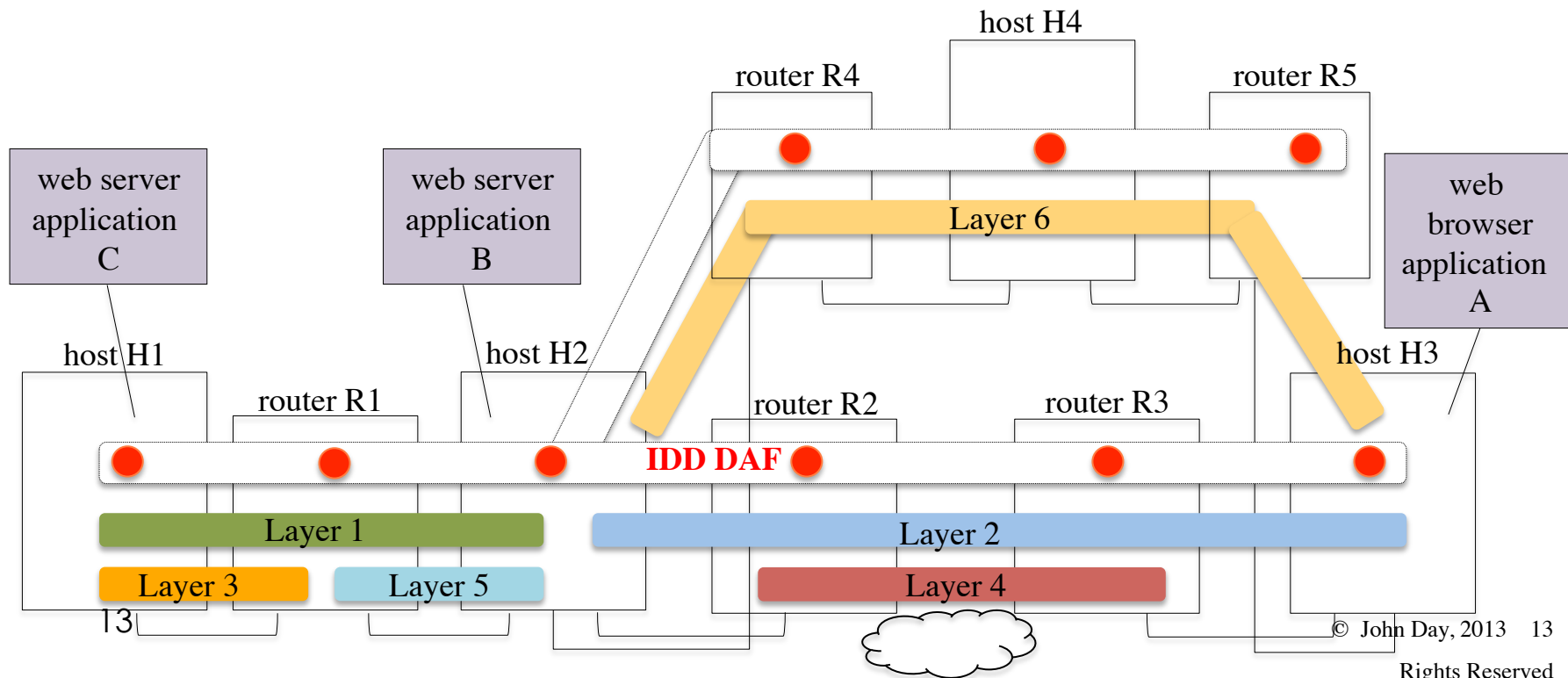
Discovery of the application

- Confirmation that the requested application is available in the destination system and authorization check that the requesting application has the rights to access it



Creation of the supporting DIF

- ▶ A DIF supporting the communication between the two user applications has to be found
- ▶ This either involves creating a new DIF from scratch or expanding (joining) an existing one so that it spans from the source to the destination system



Implications

- There is no application discovery mechanism in the Internet today, just pointers to where to search next as it happens with DNS
- Applications do not have to be in the same layer to discover each other, especially not on the same one layer as with IP
- Elimination of the need for layers with large address spaces
 - In other words there's no need for a global address space
- No need for a single application namespace. Name spaces can be tailored to environments.
- Greater security by having multiple application namespaces and by better compartmentalization without impairing reachability

Another Interesting Pattern

- Notice that the pattern exhibited by the NSM-DSM of:
 - Look up among distributed data bases (NSM-repositories) followed by determining a path (of DIFs).
- Has precisely the same structure as the Flow Allocator:
 - Look up among distributed data bases (Directory) followed by determining a path of relays (Routing).
- The first involves multiple DIFs
- The second involves multiple IPC Processes.
- There may be another collapse here.

Questions?