parc®
A Xerox Company

CCN Overview

Glenn Edens, Vice President

A future Internet architecture: CCN

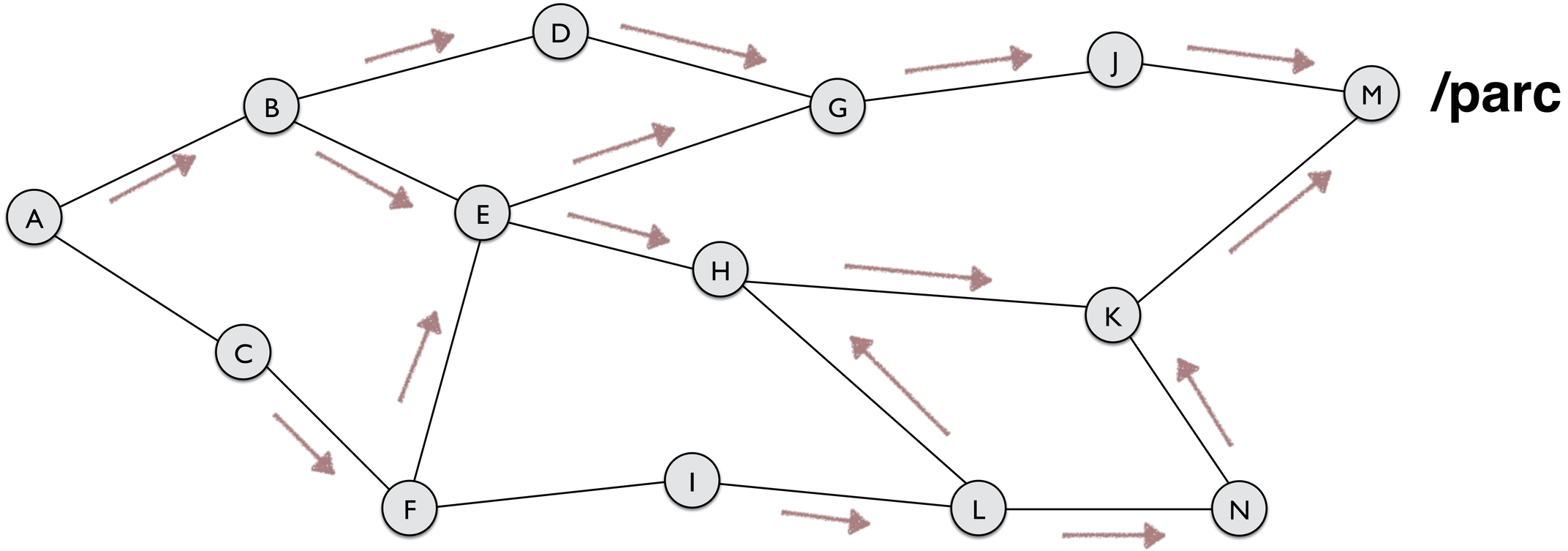
We have a proposal that

- Is secure
- Provides high availability
- Transfers data independent of location
- Leverages storage and processing

It does this by

- Naming all data, securing all data and communicating based on name

Names are advertised via routing



Routes are set up pointing to M for prefix /parc

Core protocol

An Interest Message

A Content Message

A request for a named piece of content

A reply with a named piece of content

CCN names

/parc/ccnx/presentation/slide7/v=2/c=0

globally routable
name segments

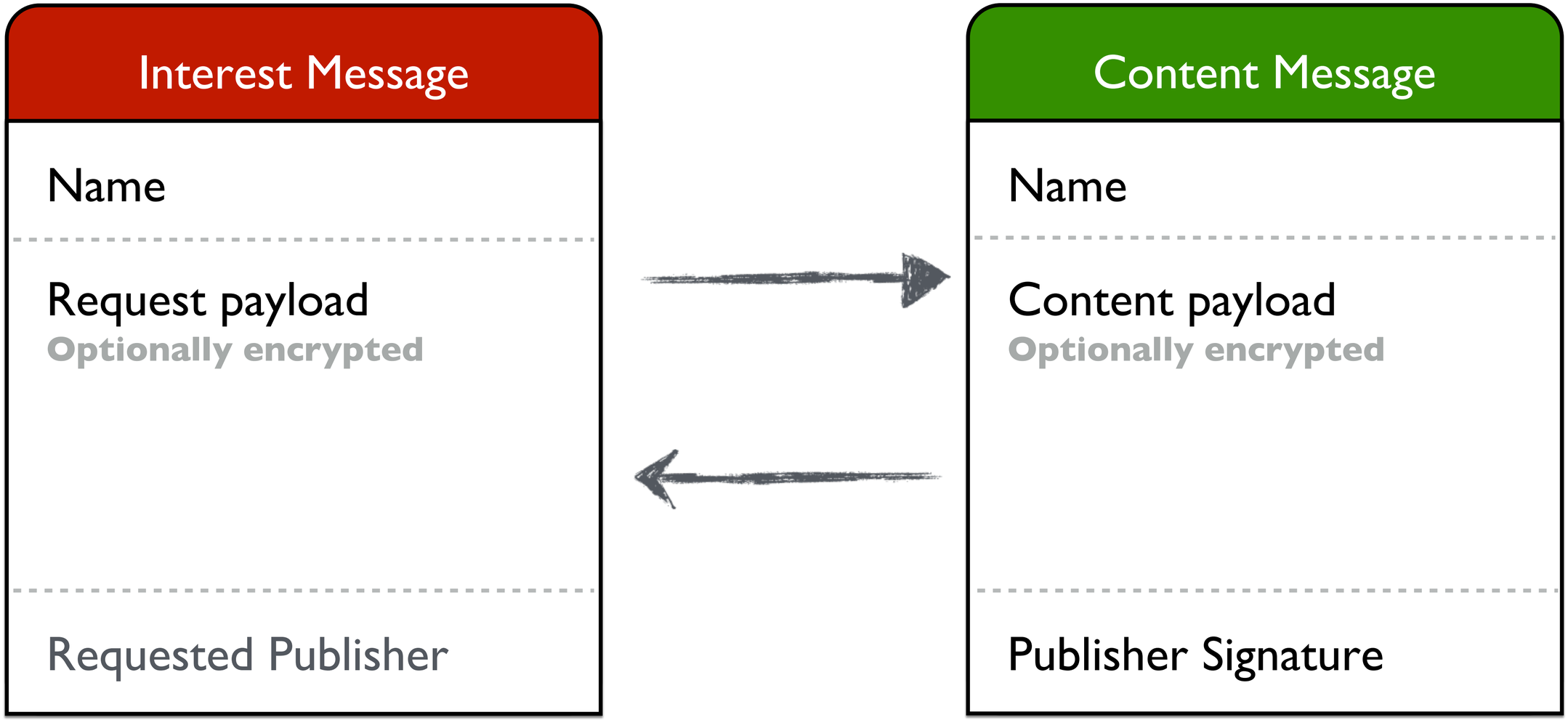
system / application
dependent name segments

protocol dependent
name segments

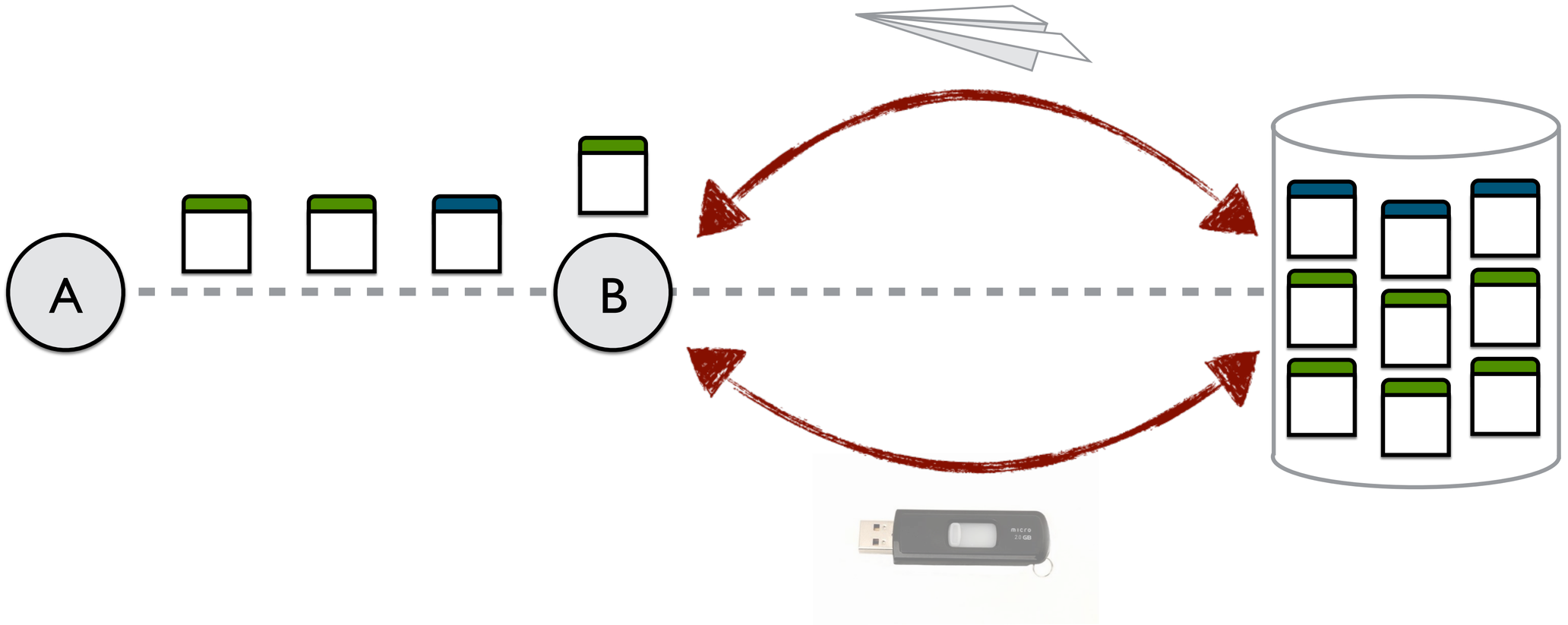
Everything has a name
Hierarchical

Don’t have to be human readable
Replaces IP addresses and ports

Core messages



Unifying network and storage

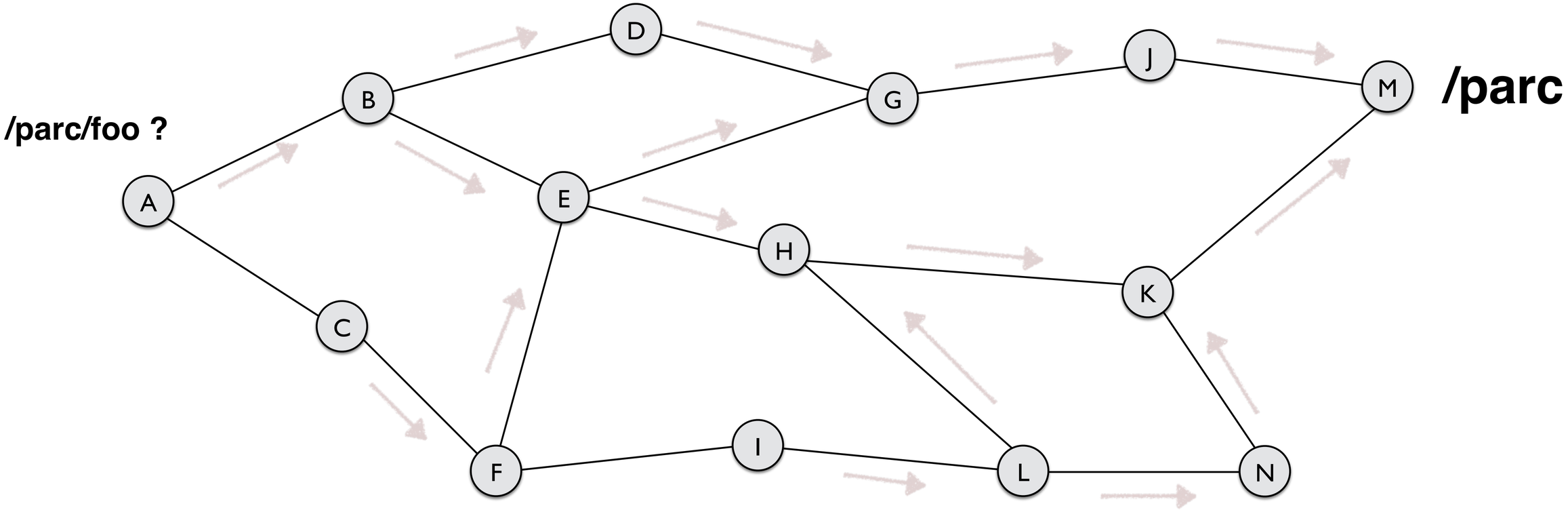


Messages are secure
(in motion and at rest)

Messages are the same
(in network and in storage)

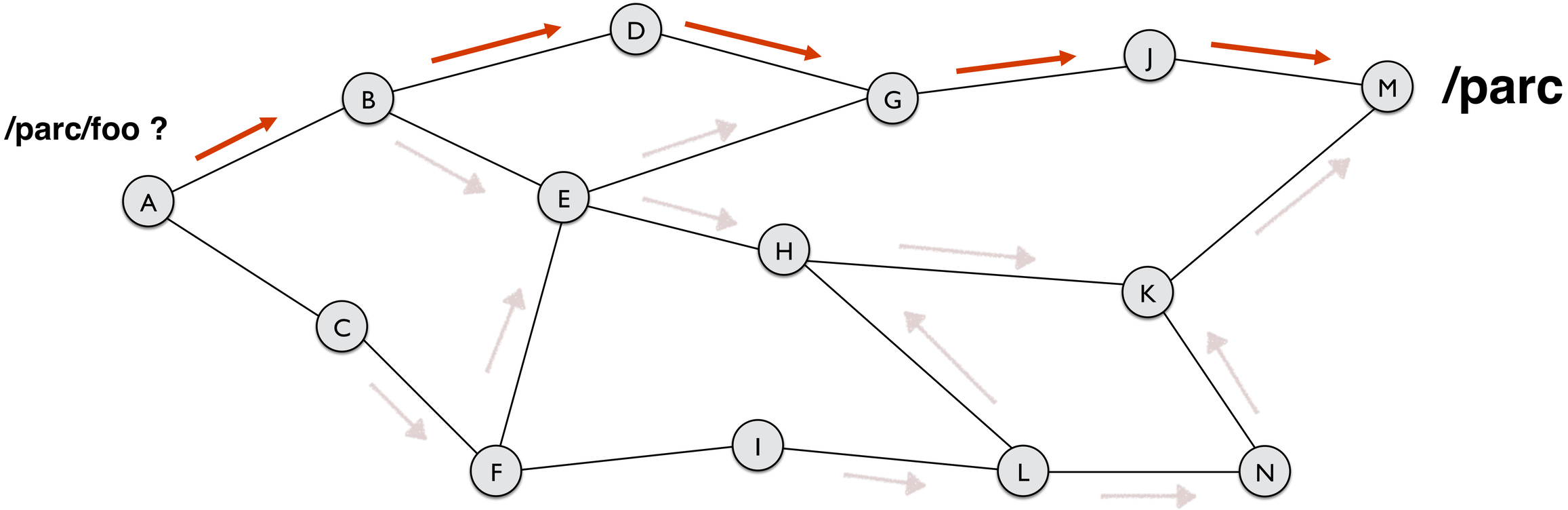
parc
A Xerox Company

A simple example



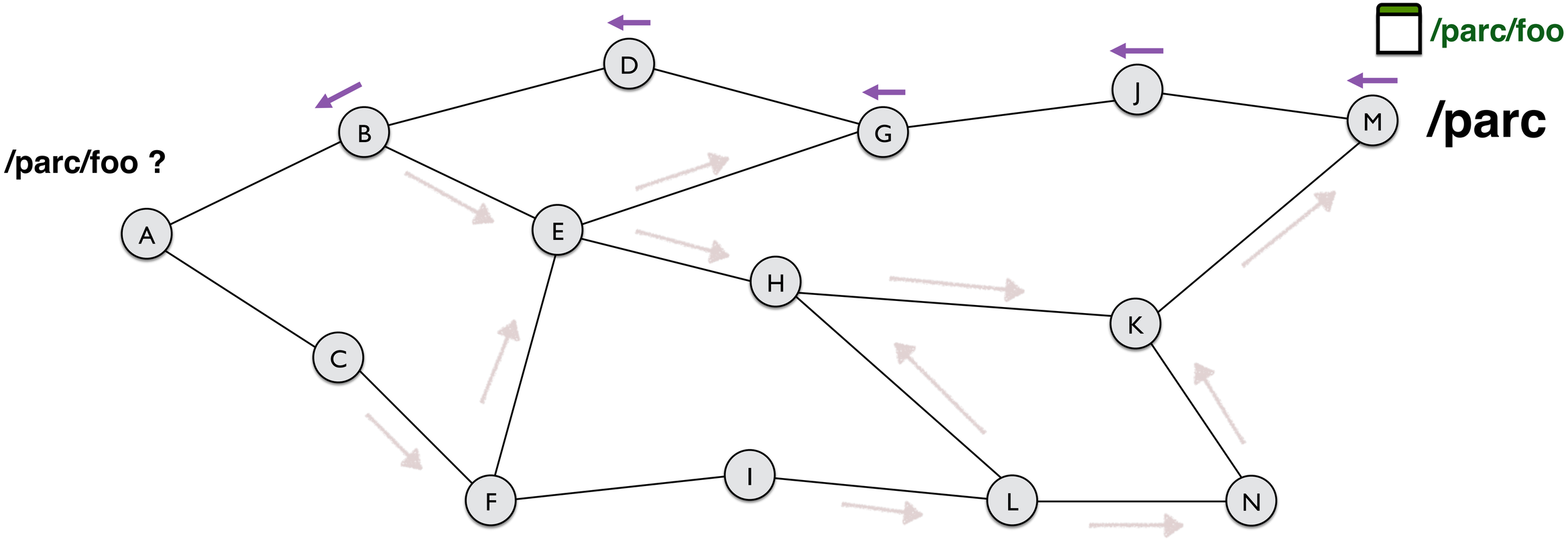
Node A has a request for /parc/foo - issues an interest

Interests follow the advertised route



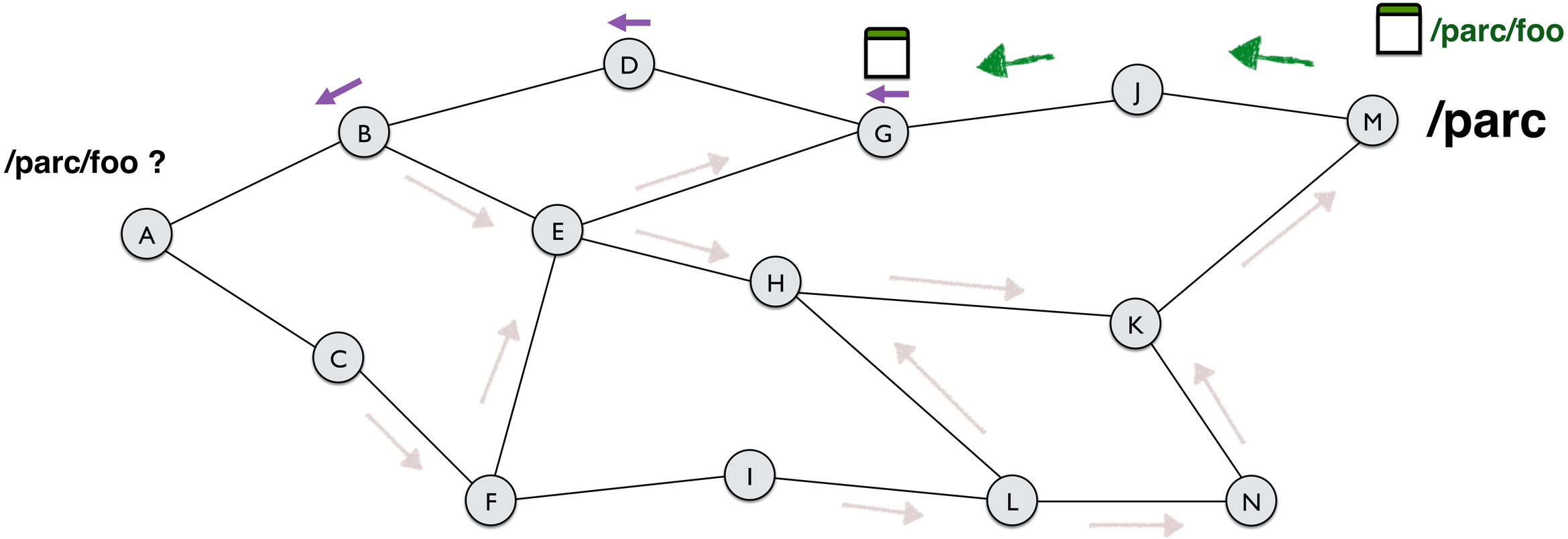
Interests are forwarded towards the node that advertised the name /parc

Interests leave state along the path



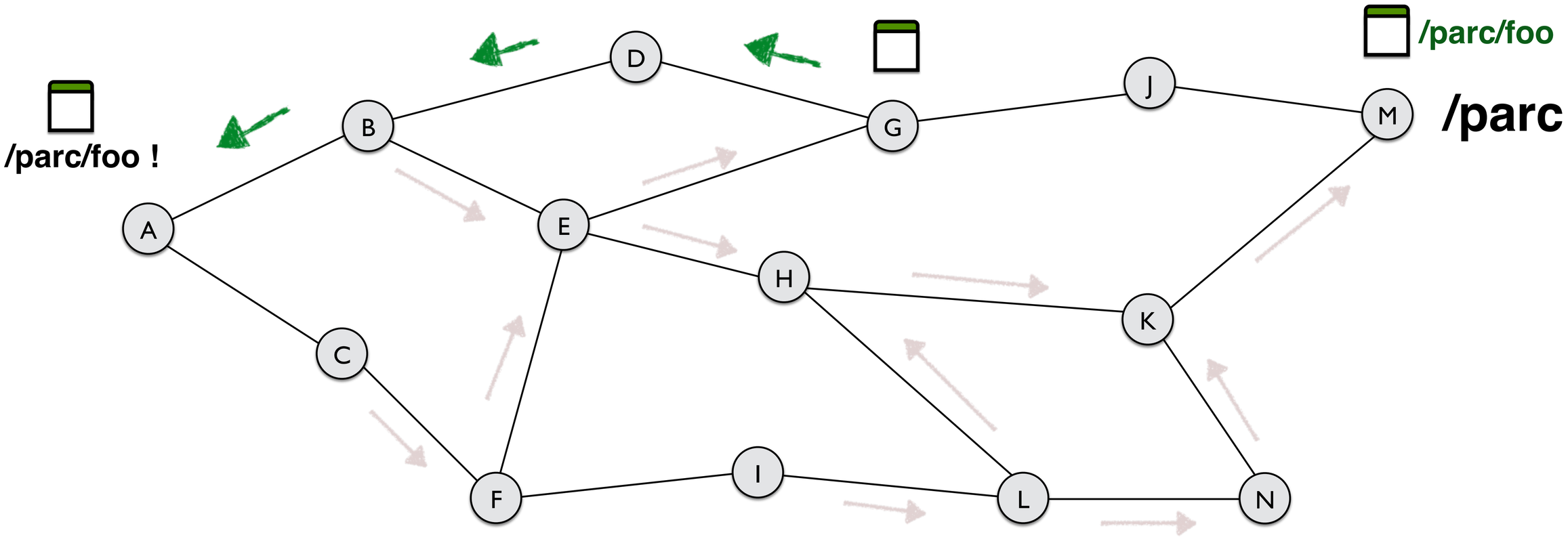
Routers keep information about the reverse path of the request

Content Messages follow reverse path



Reverse path state gets consumed as Content Messages flow

Nodes can cache Content Messages

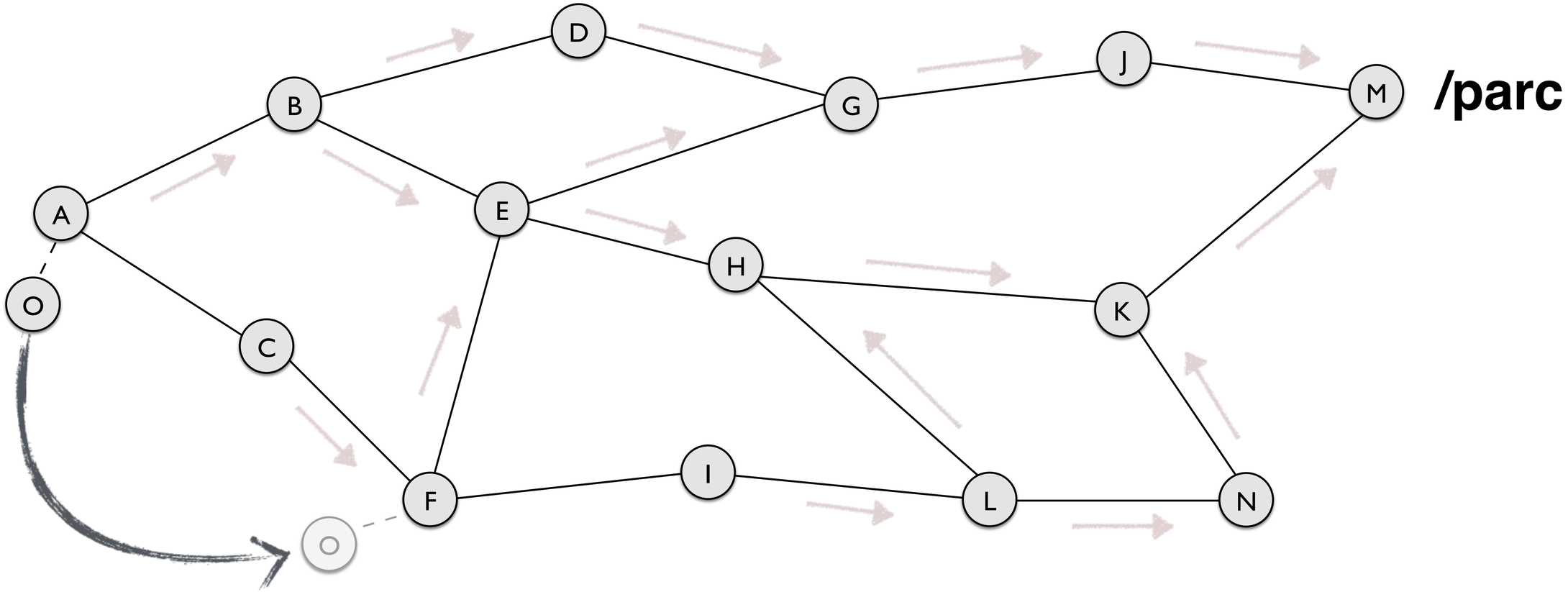


Caching reduces load on network

Caching makes error recovery more efficient

parc
A Xerox Company

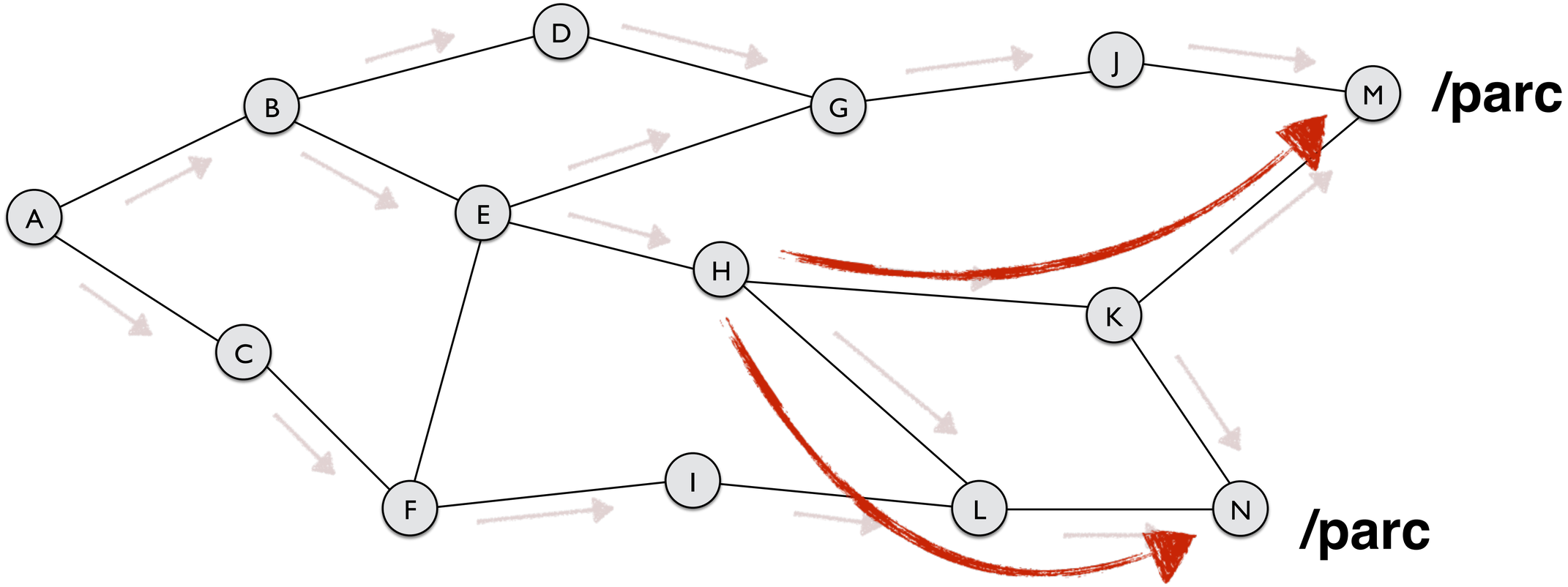
Simple mobility



Reverse path routing allows for seamless reattachment

parc
A Xerox Company

Load-balancing, redundancy and failover



With multi source, the core protocol allows the network to deliver load balancing, transport redundancy and automatic failover

parc
A Xerox Company

CCN - What is it?

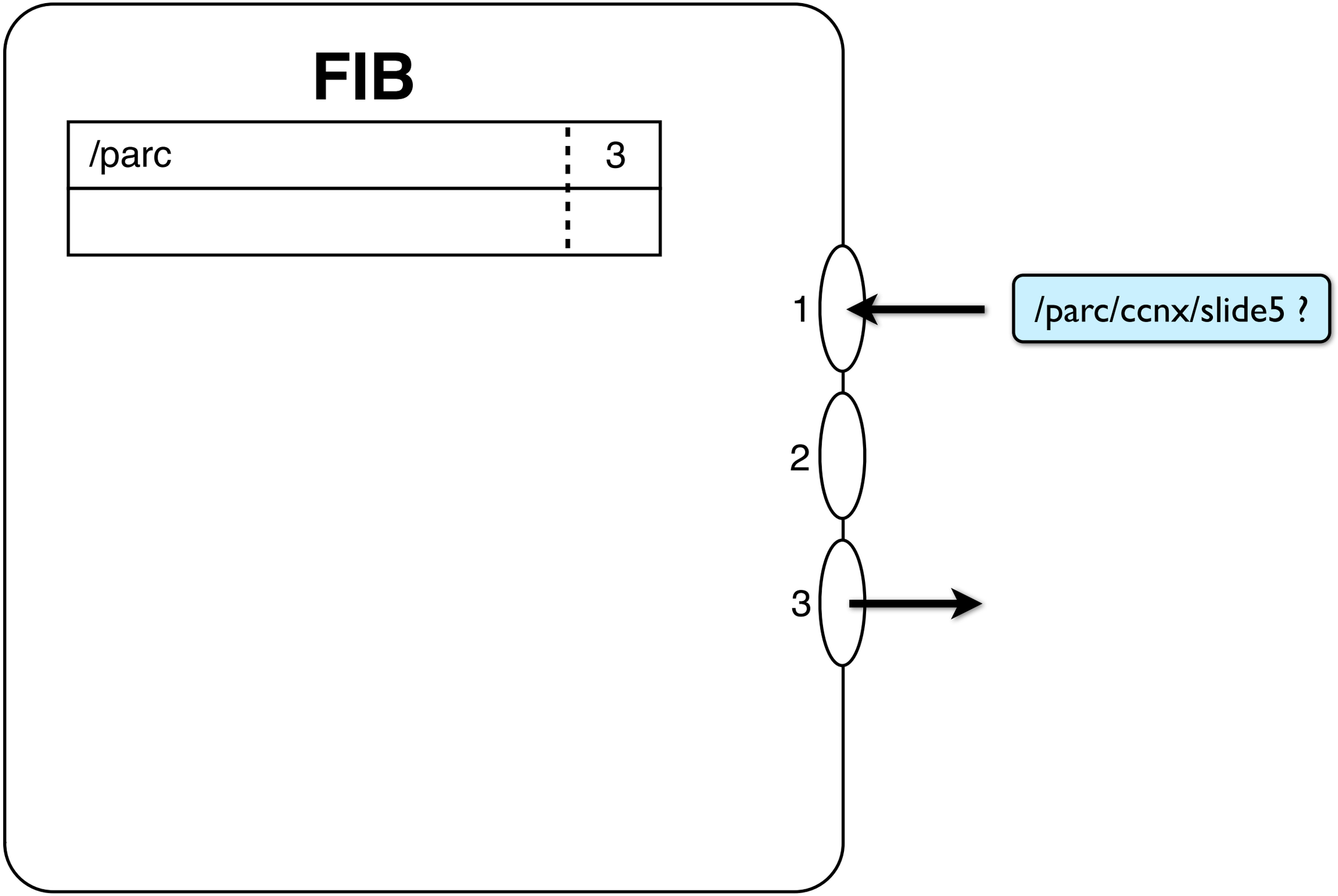
Content Centric Networking (CCN) is a communications architecture based on dissemination rather than conversation

Communicate via

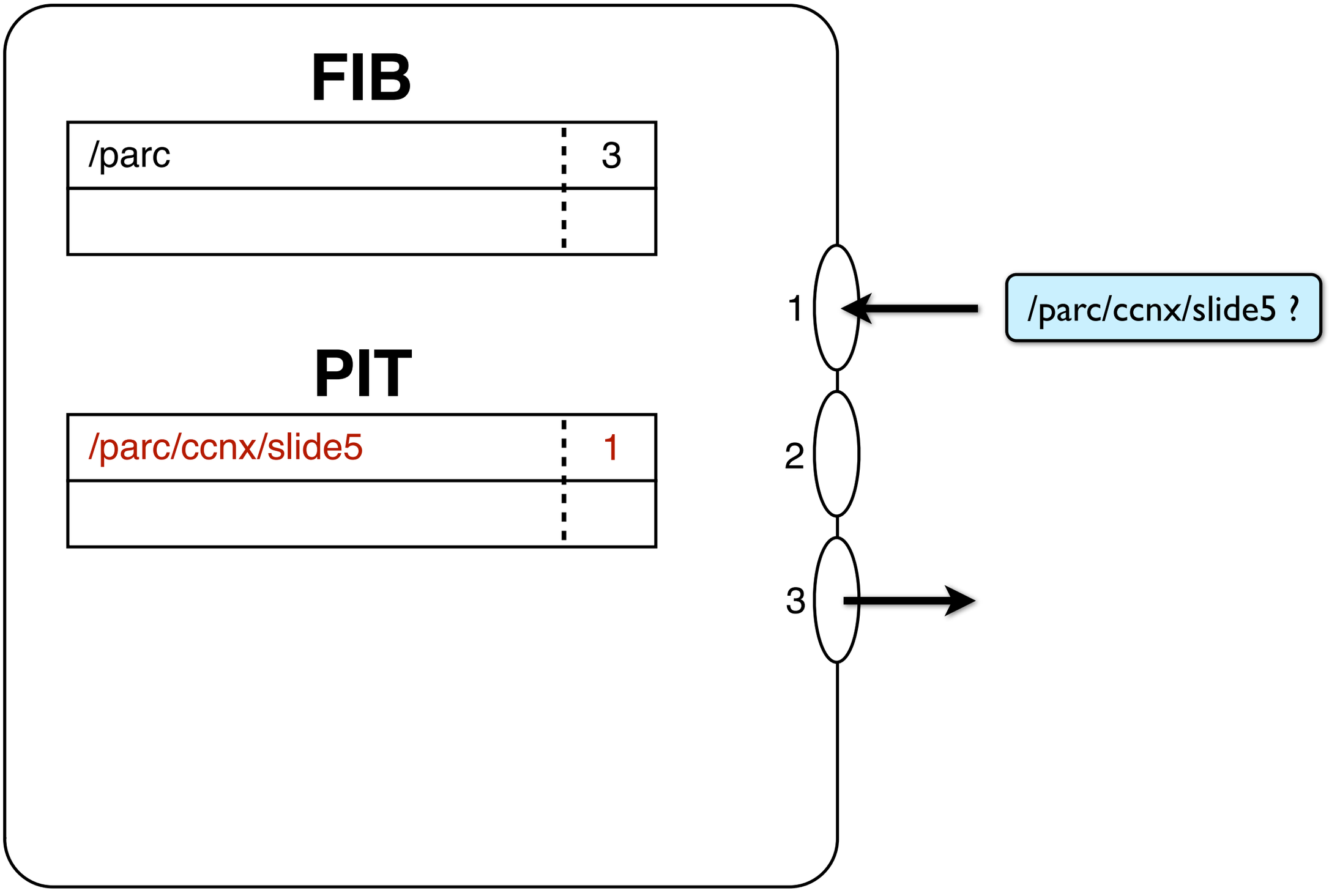
Named Data

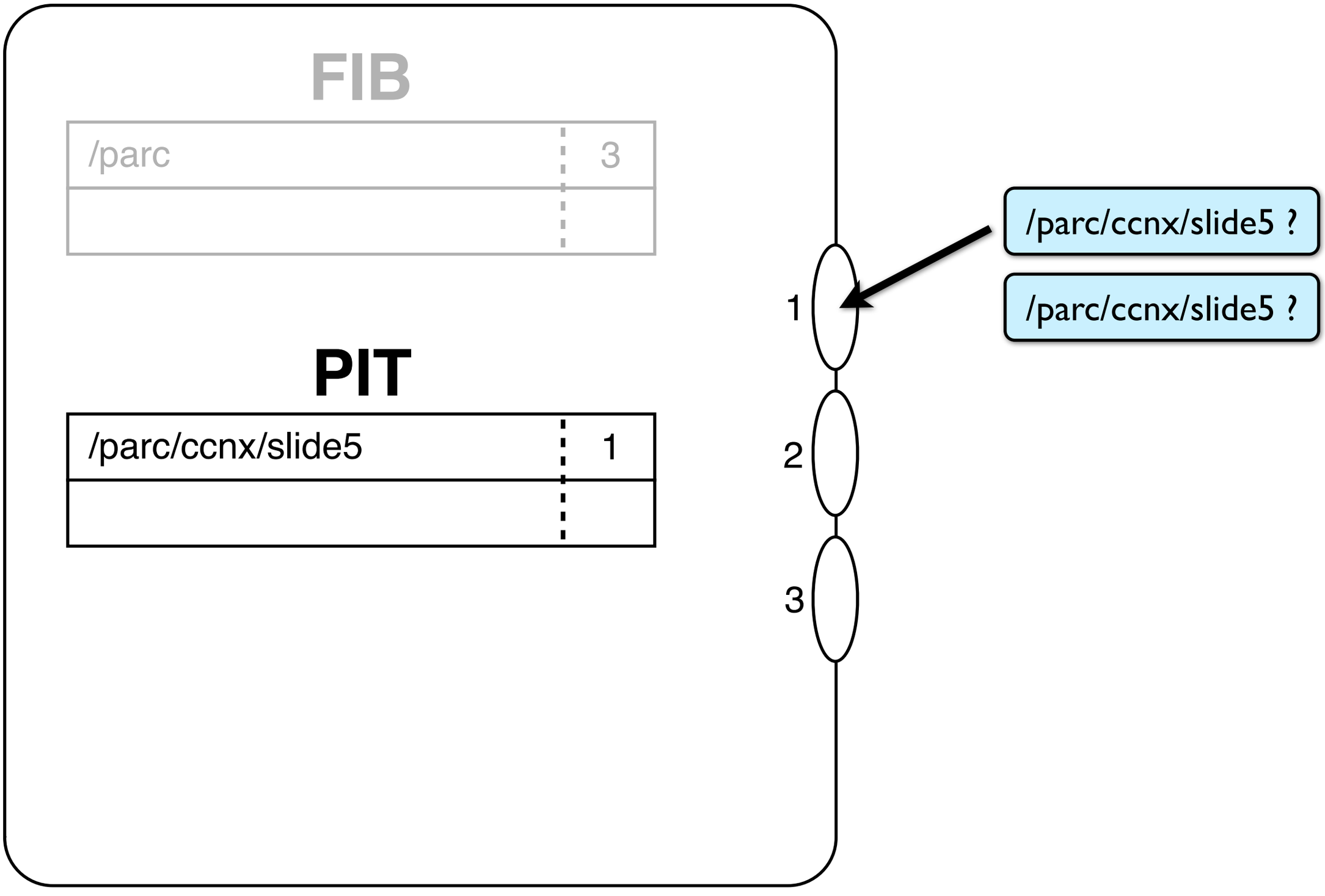
Request by name

Route by name



Keep state





FIB

/parc	3

PIT

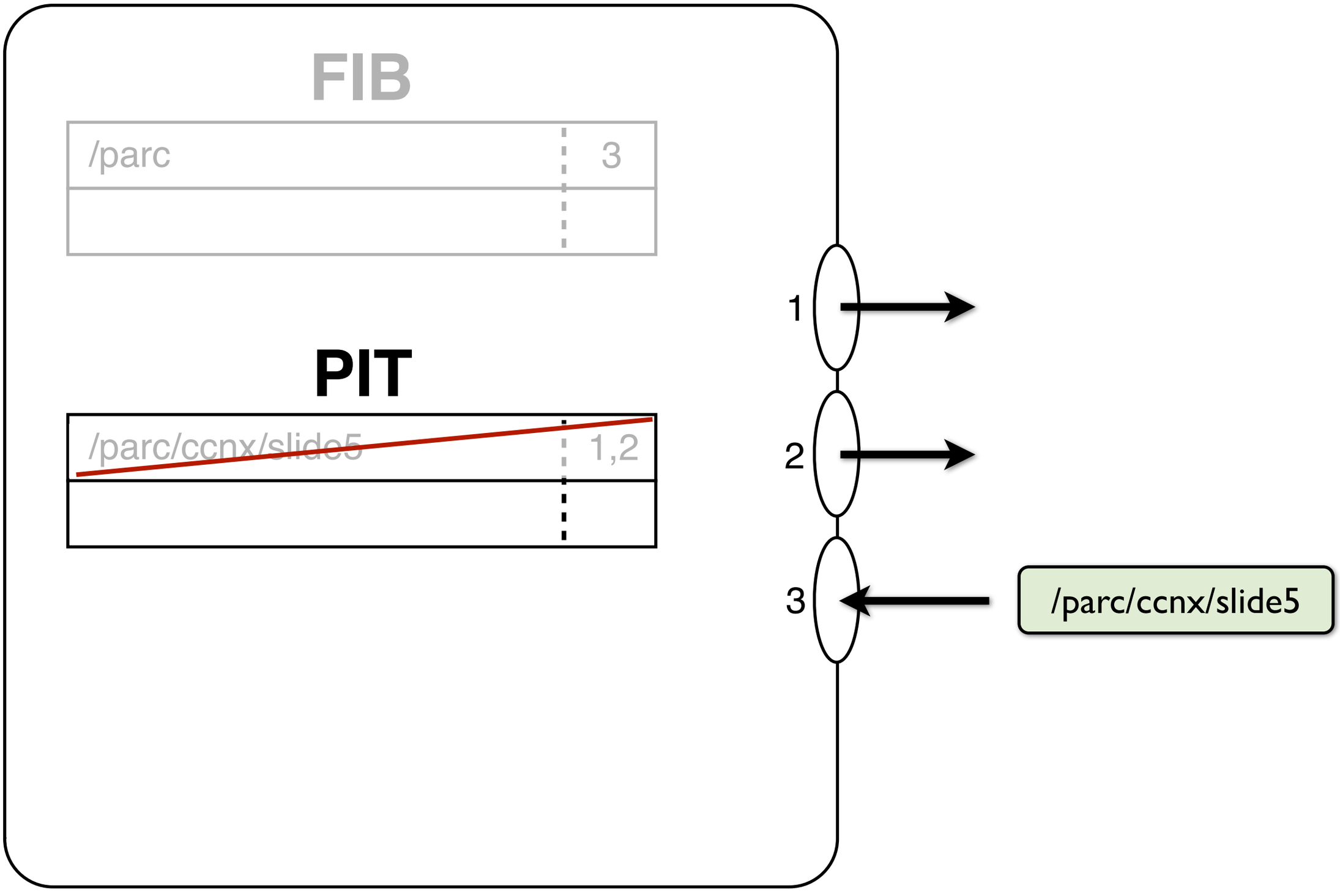
/parc/ccnx/slide5	1,2

1

2

3

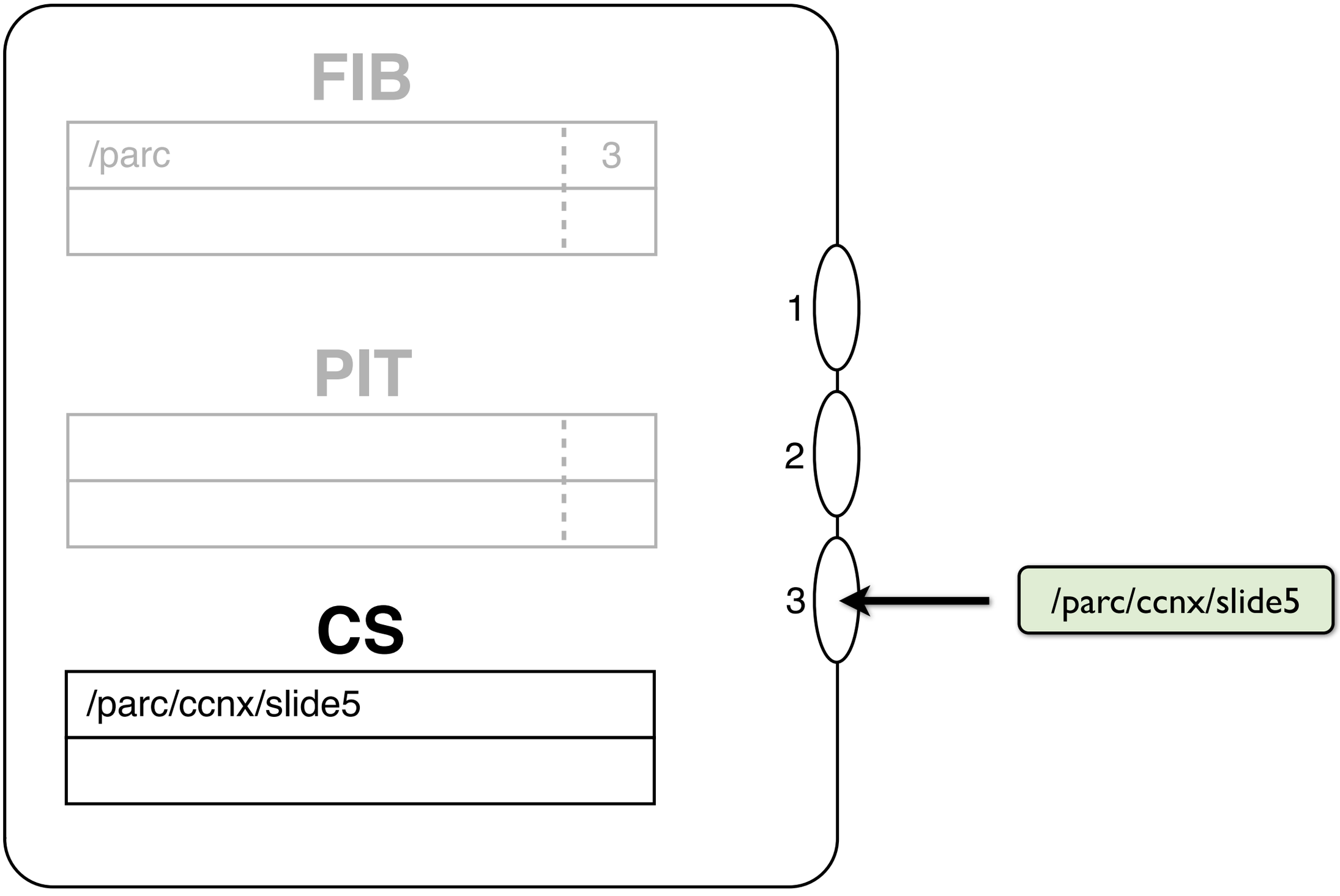
/parc/ccnx/slide5 ?

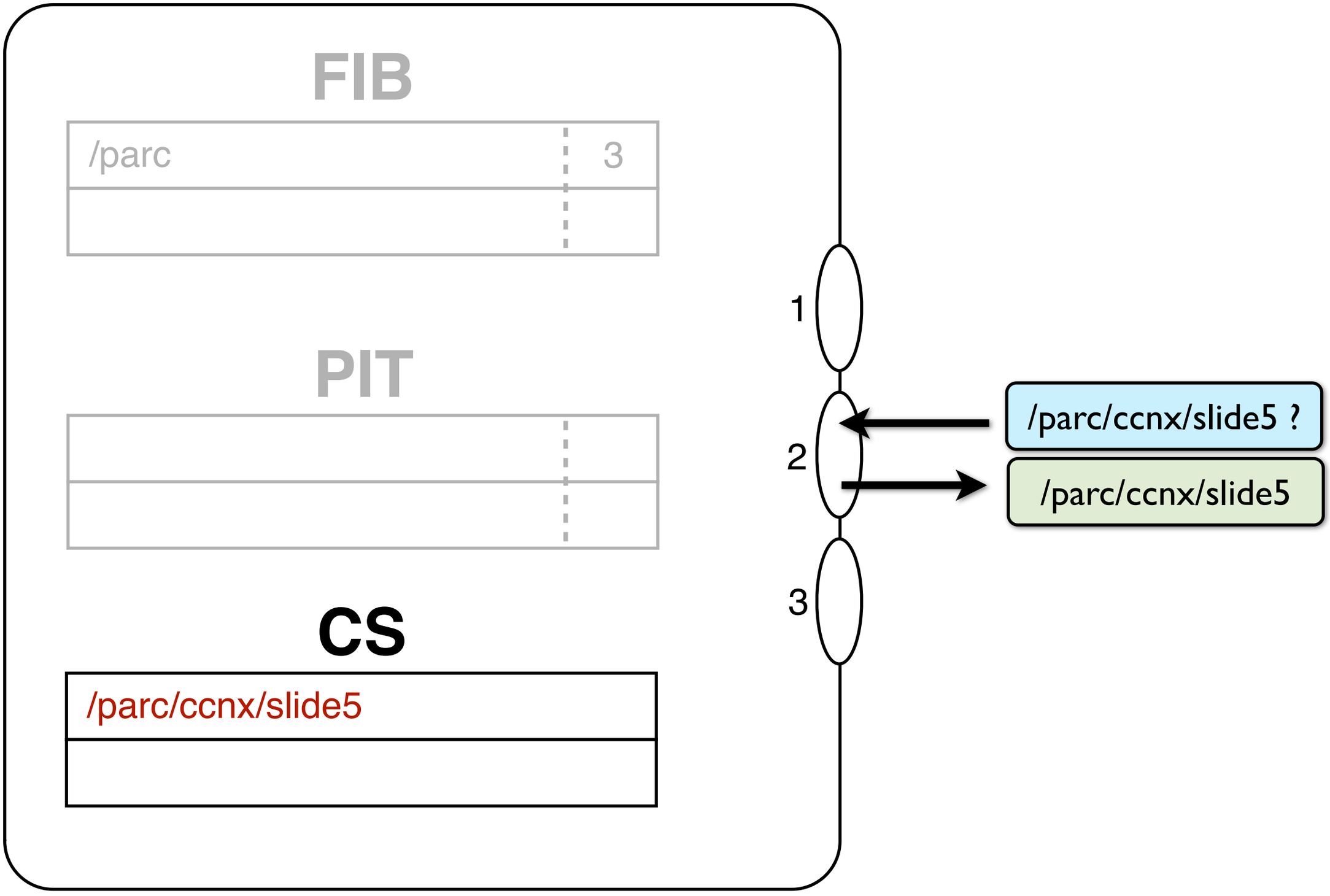


optionally

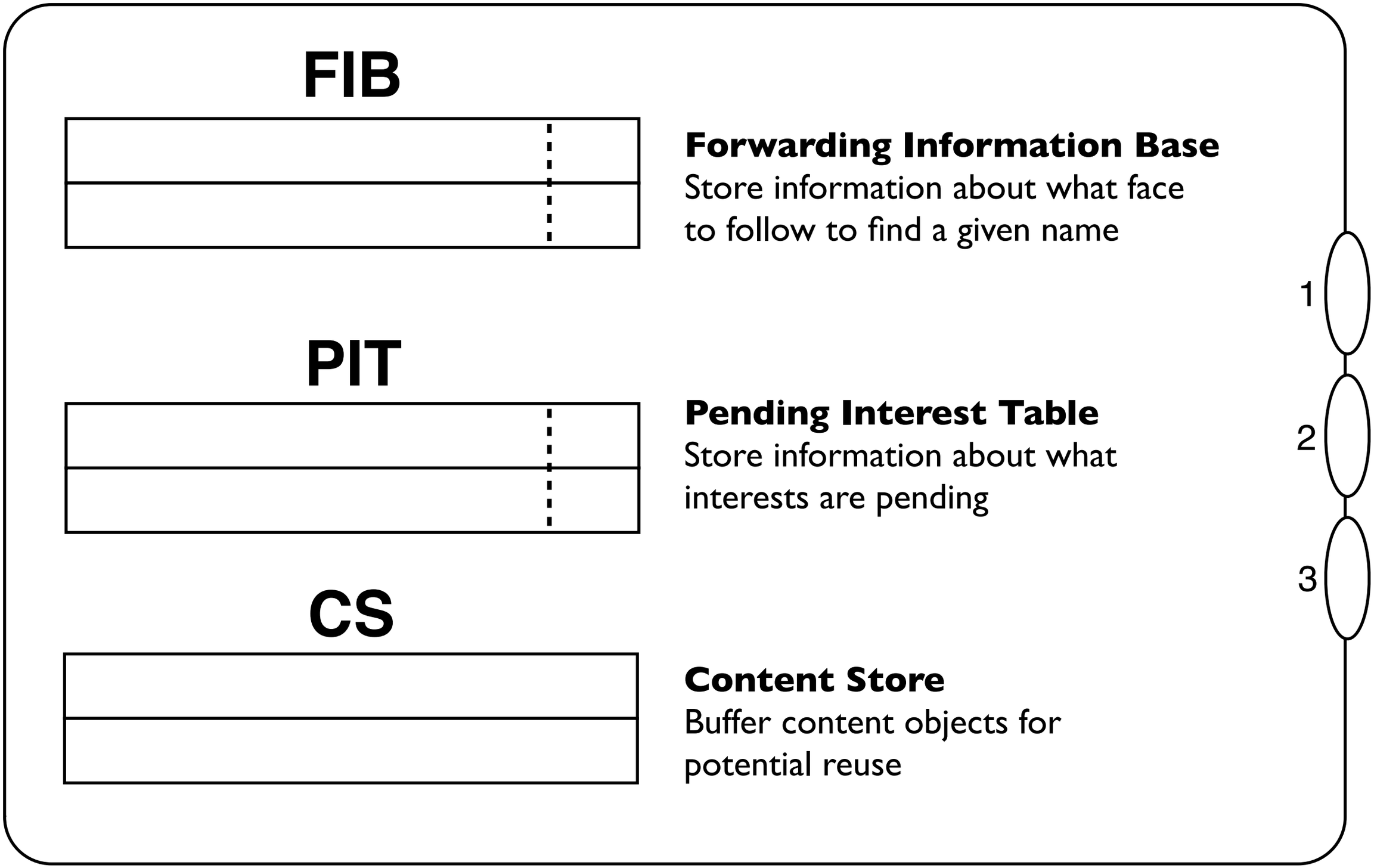
Keep data

(more state)

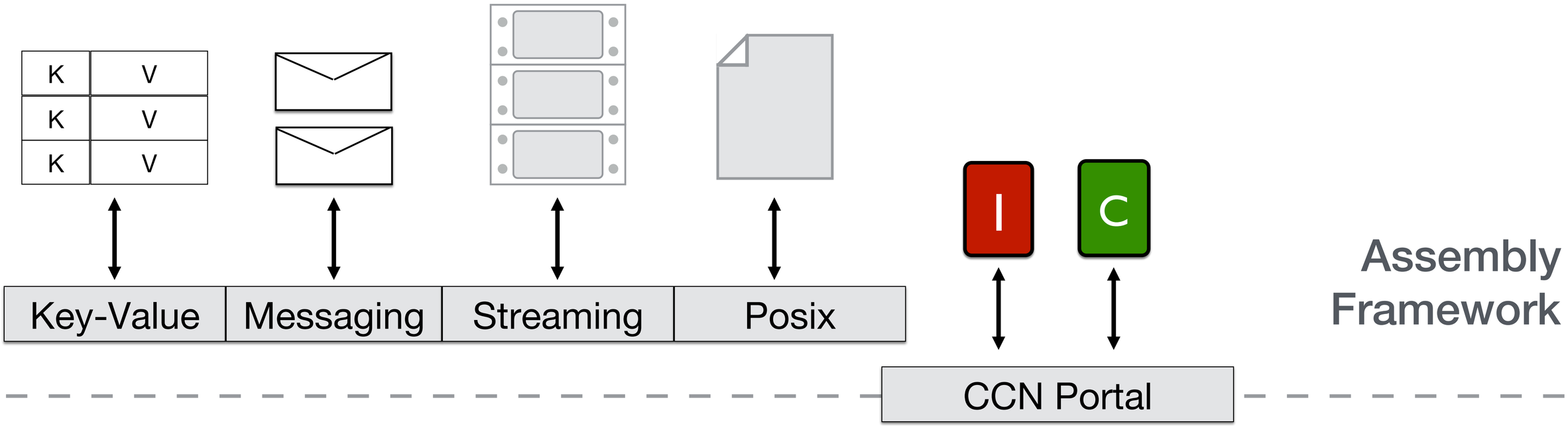


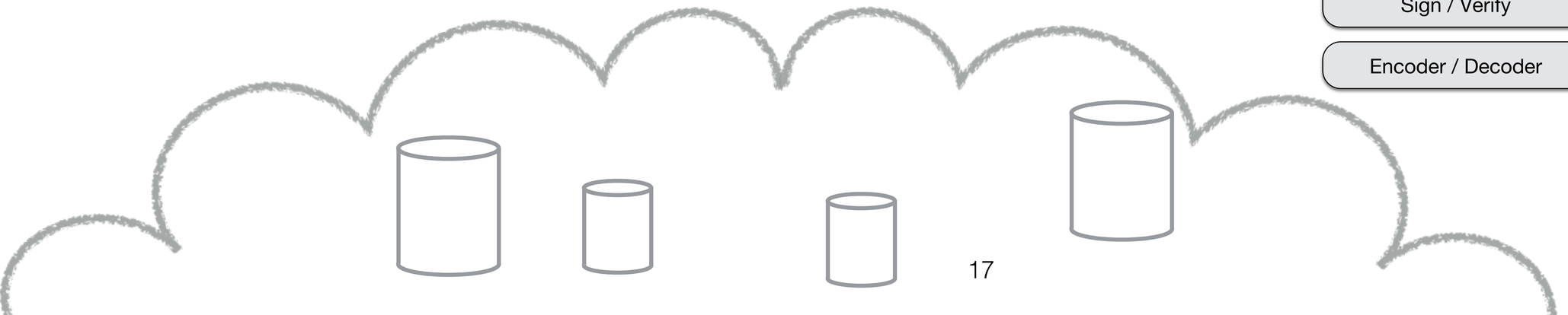


Unify Architecture



Network abstraction





parc
A Xerox Company

Benefits

Secure and Resilient

- Individual content objects secure in motion and at rest
- Network not susceptible to IP style network attacks

Flexible and Efficient

- Base network offers load balancing, redundancy and failover
- Can handle heavy loads and perform local repair
- Core protocol and messages scale up and down

Extensible and Comprehensive

- Modular APIs to access network functions and services
- Common data structures between network, APIs and applications

Adoption

Progress…

Networks are becoming even more software based
enabling the introduction of new protocols in the ‘fast path’

We are at a major inflection point - 5G, IoT, ‘Cloud’

Key features like security, and flexibility have a huge economic value

Incremental…

CCN can work with IP, as an overlay on IP or as middleware.

Applications and services can operate through CCN-gateways

Change, disruption, innovation

www.ccnx.org

parc
A Xerox Company