CCN

CCNx 1.0 Forwarding Introduction

Computer Science Laboratory
Networking & Distributed Systems

April 2014

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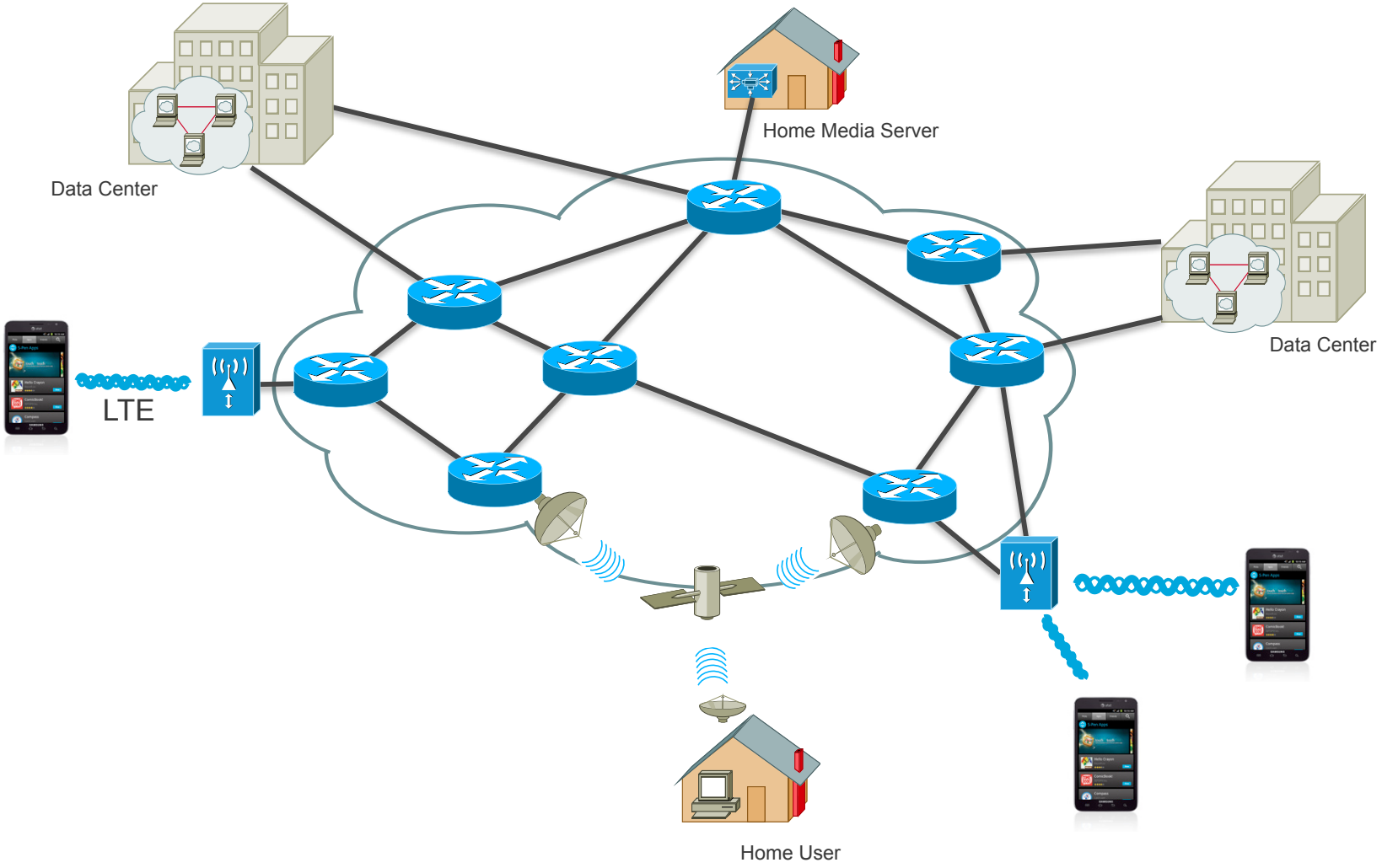
Requirements by Example

Example Network



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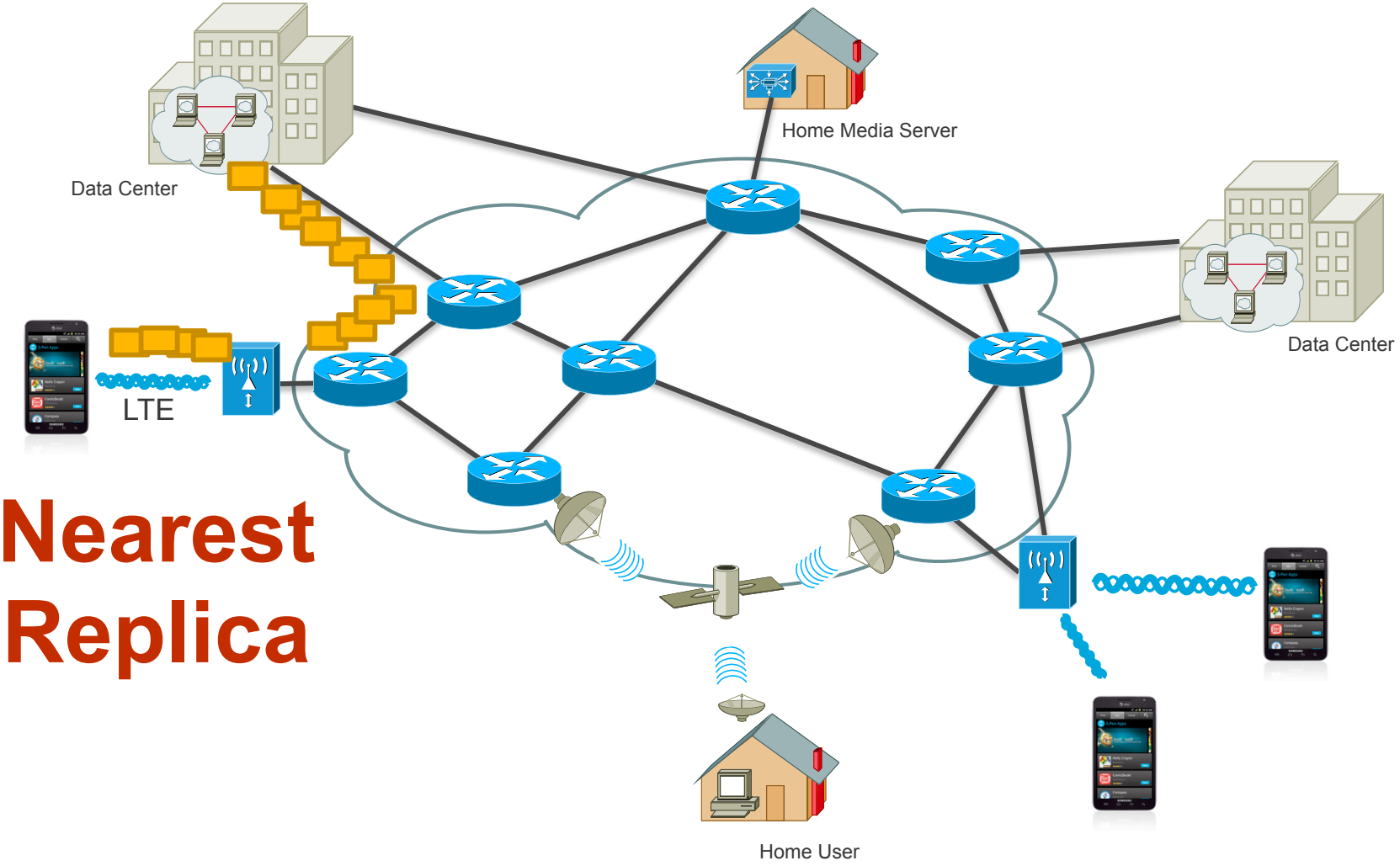
Nearest Replica



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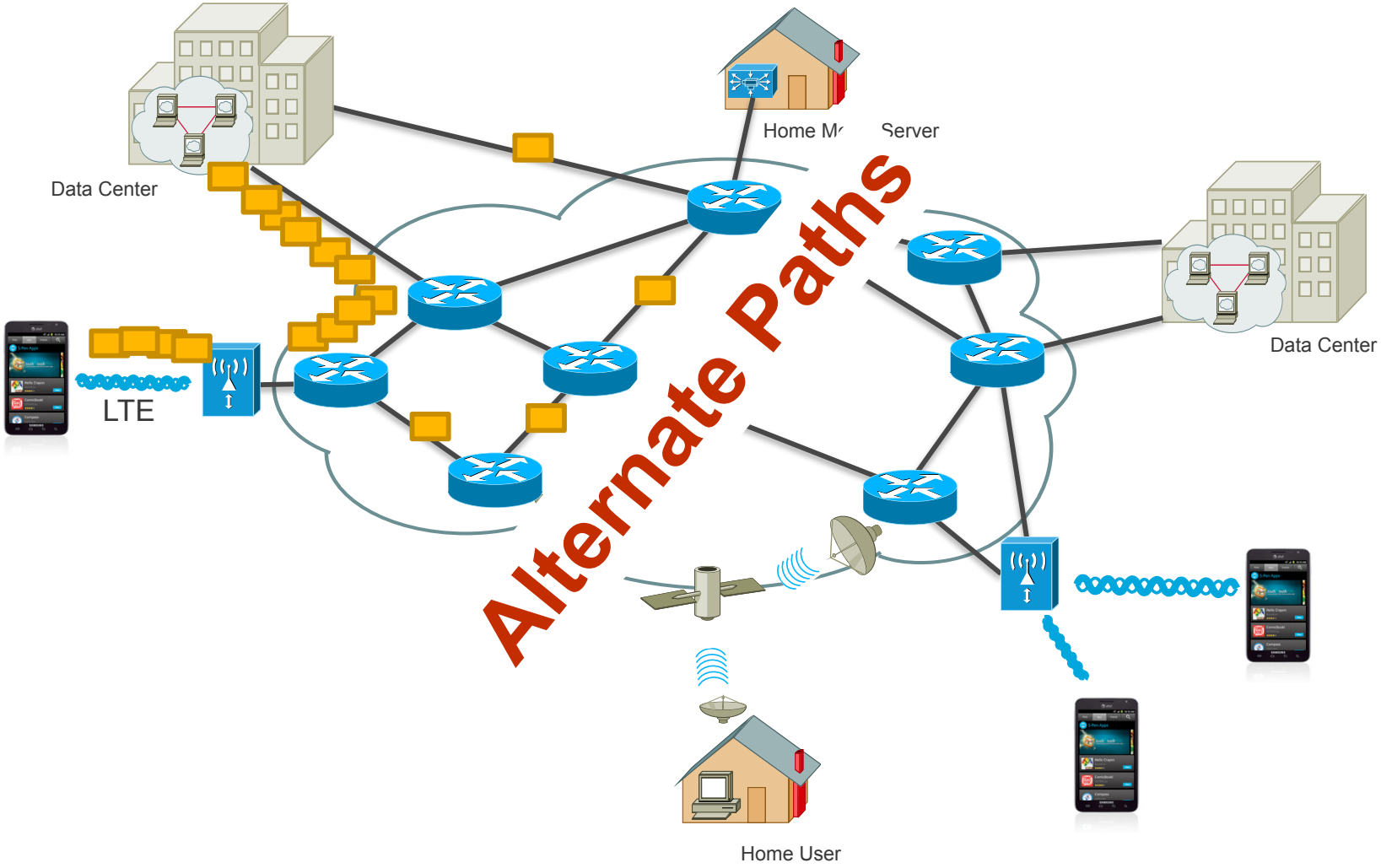

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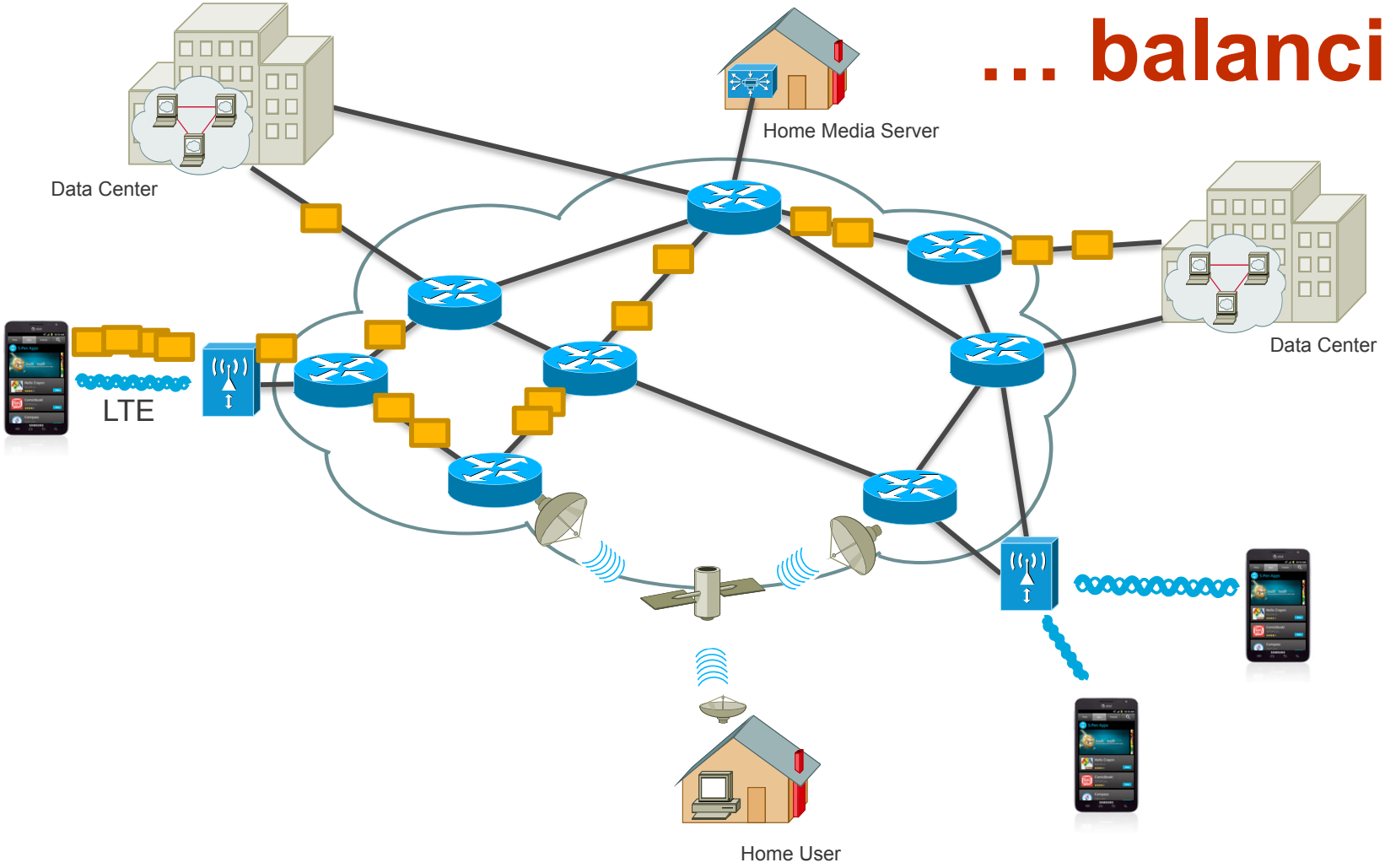
load ... ... balancing



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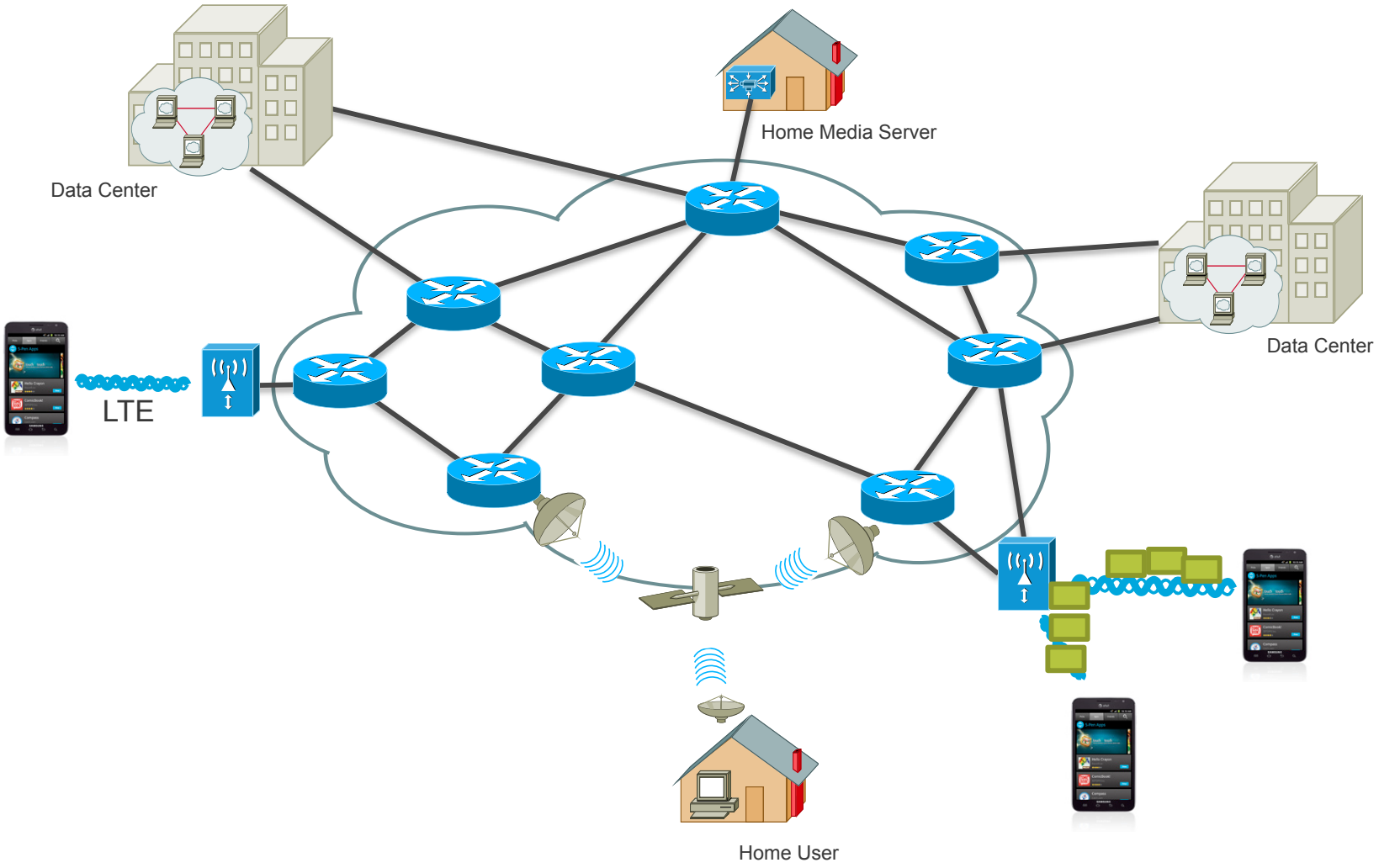

Peer-To-Peer

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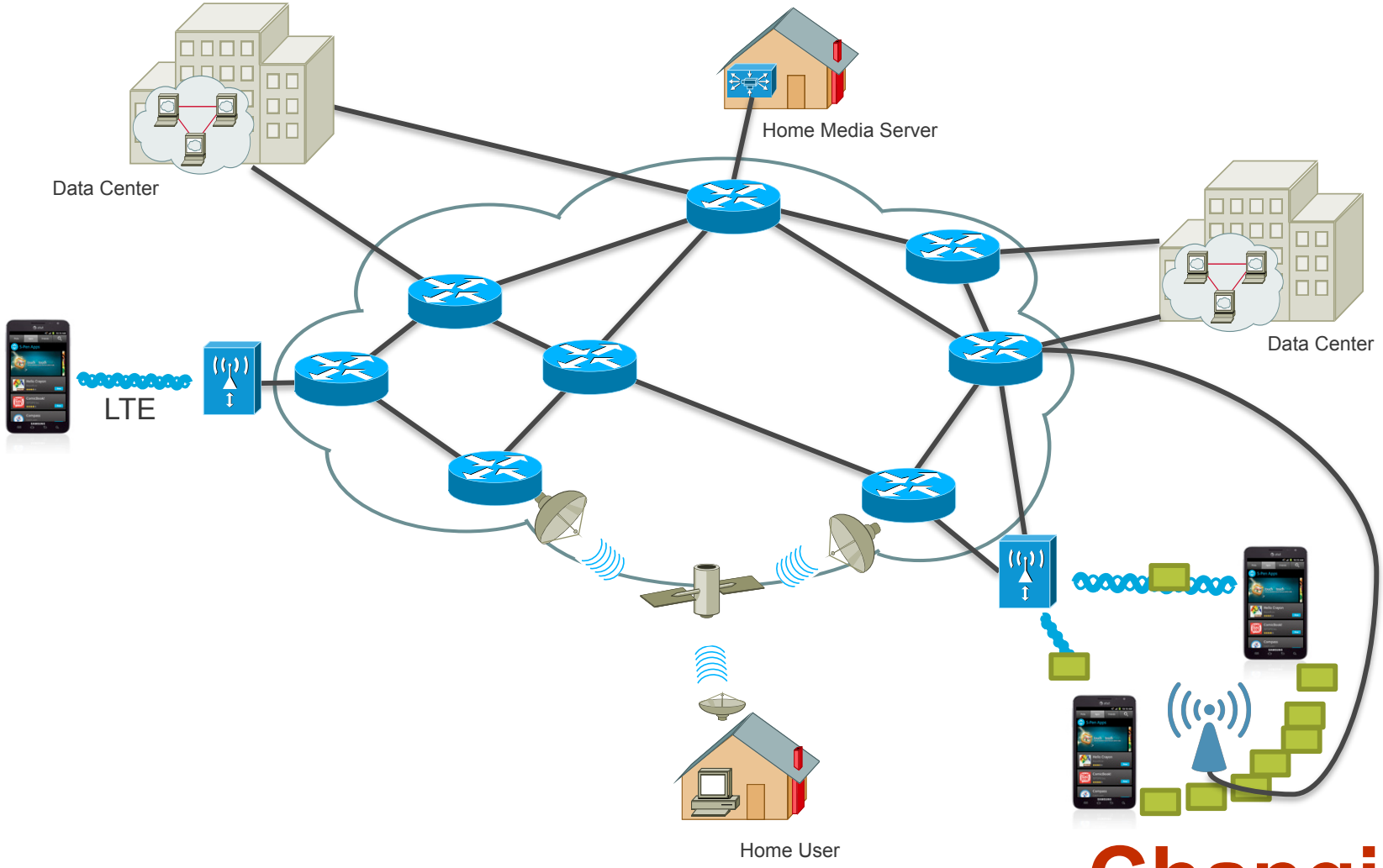

Changing connectivity

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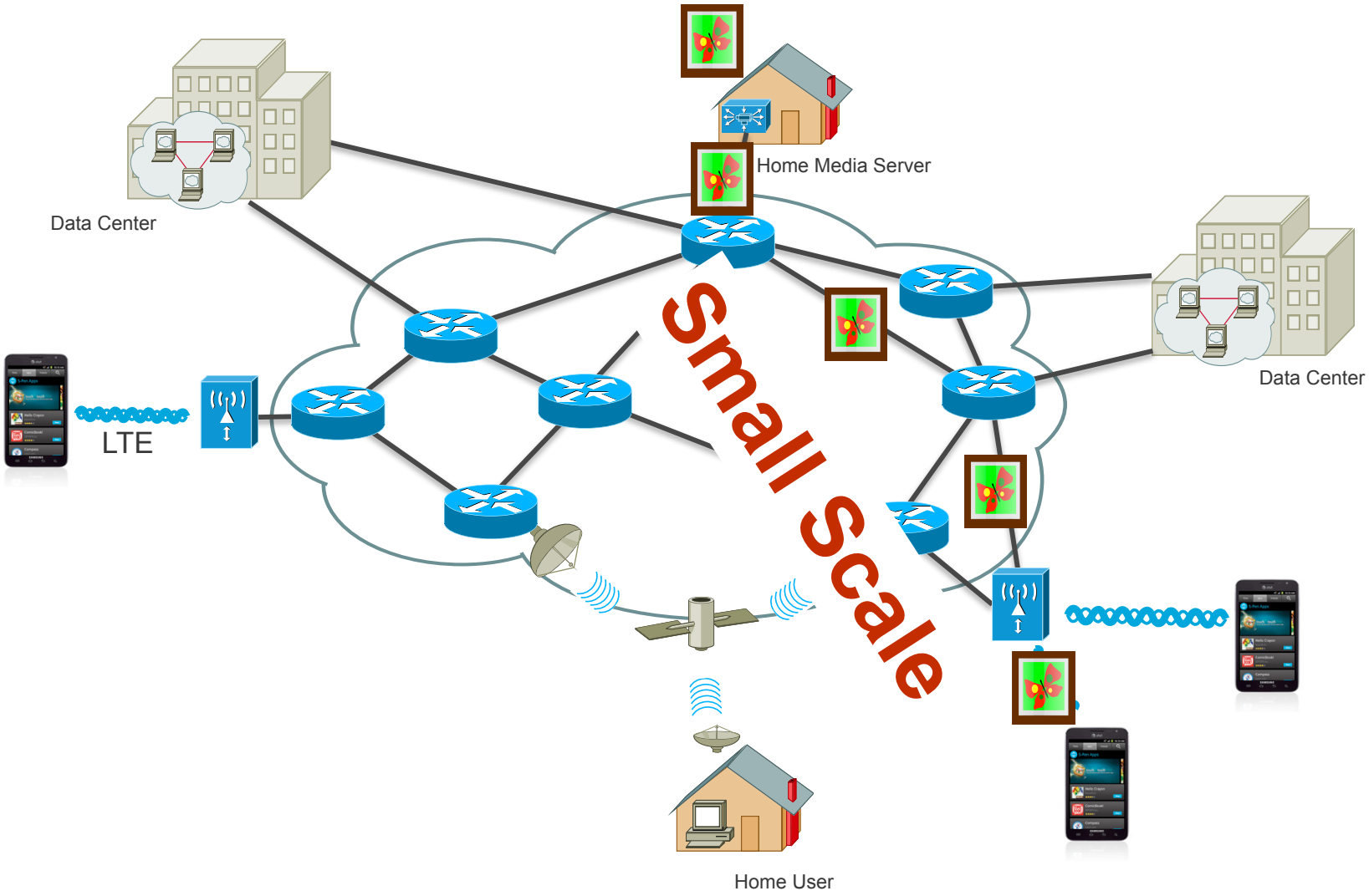

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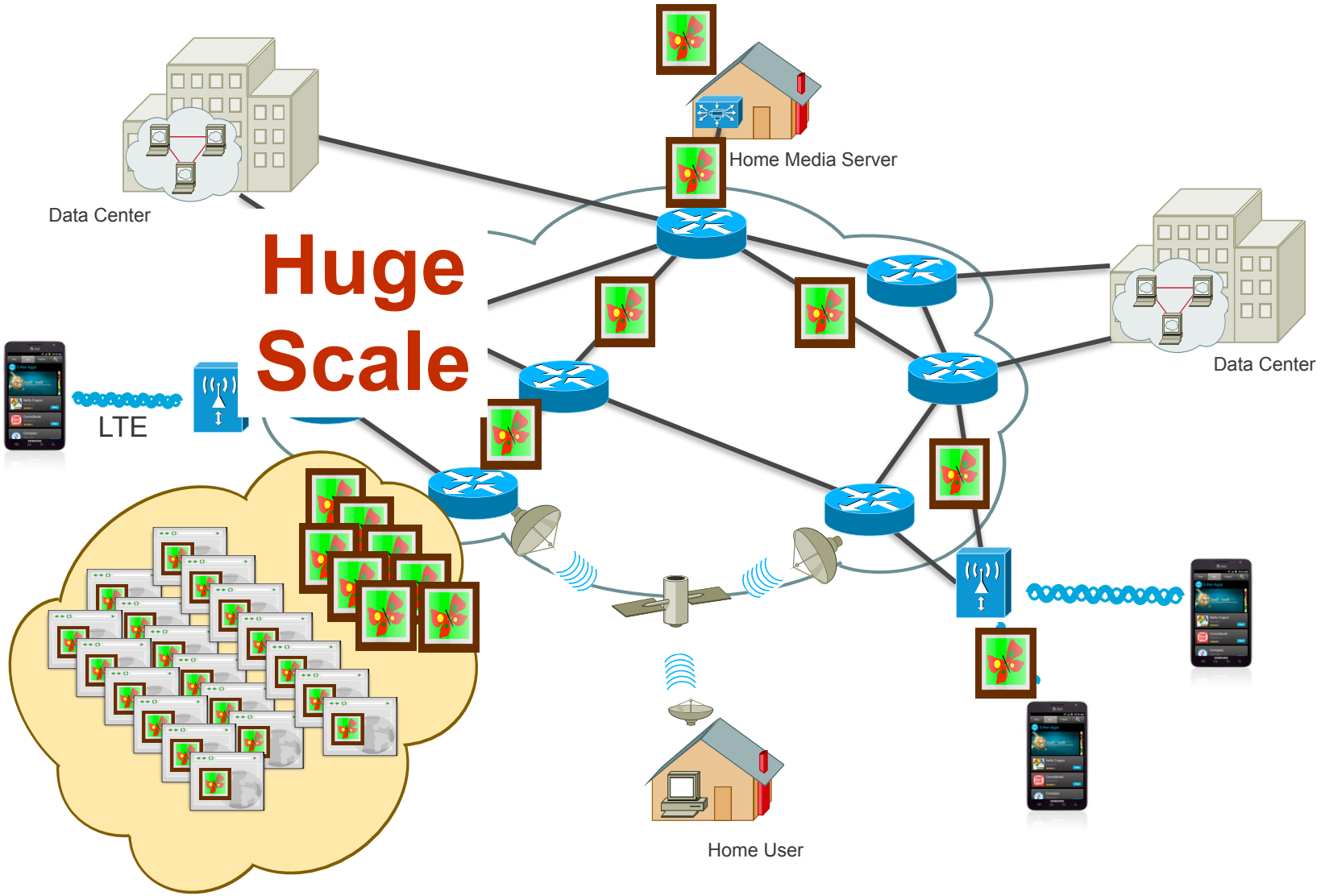

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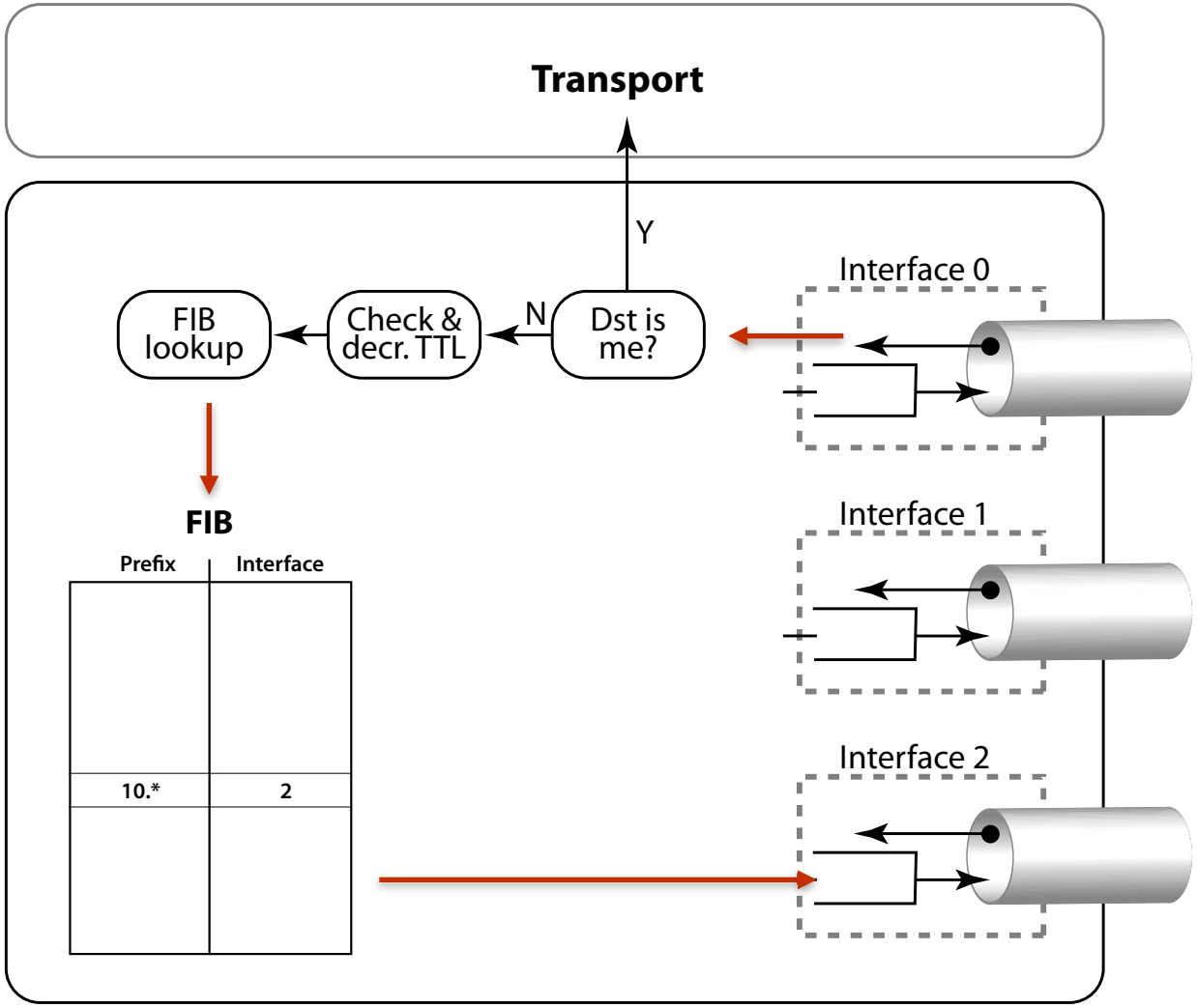
CCN Forwarder Structure

Today's Packet Flow



FIB = Forwarding Information Base

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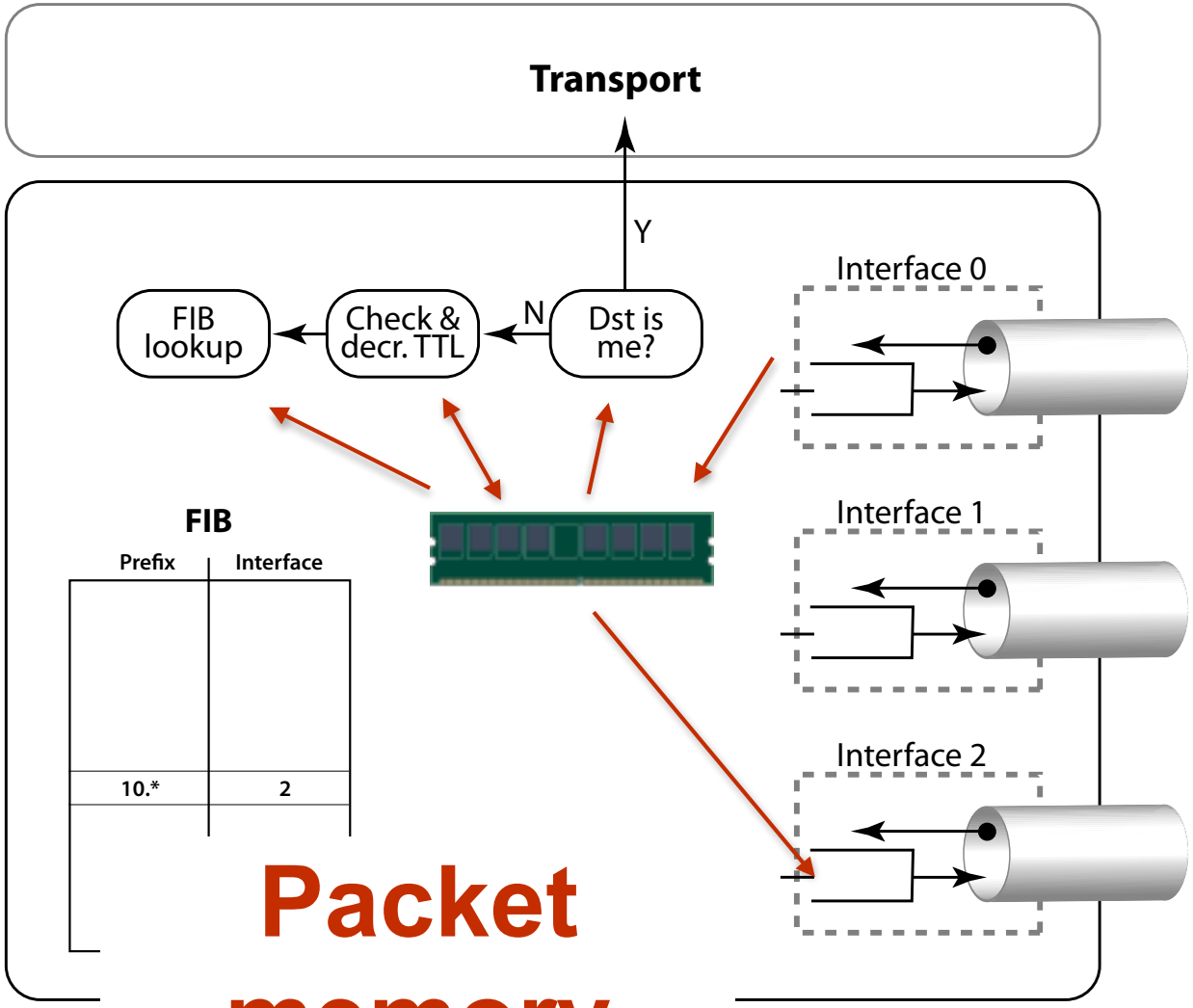


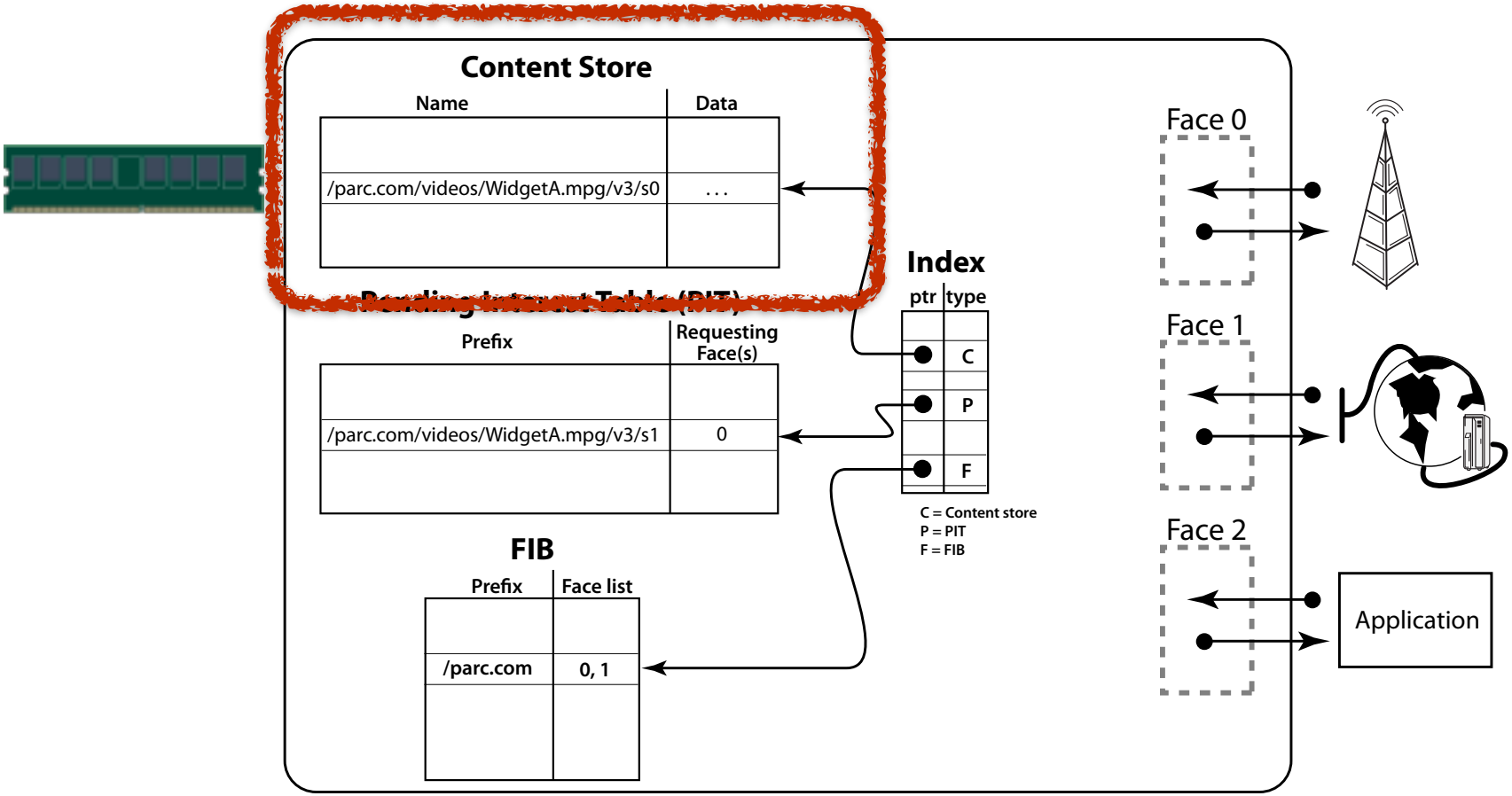
Packet memory is a cache

Routing Finding the path alternatives

Strategy How to use the Alternatives

Forwarding Processing a packet based on a strategy

Content Store like long-term packet memory



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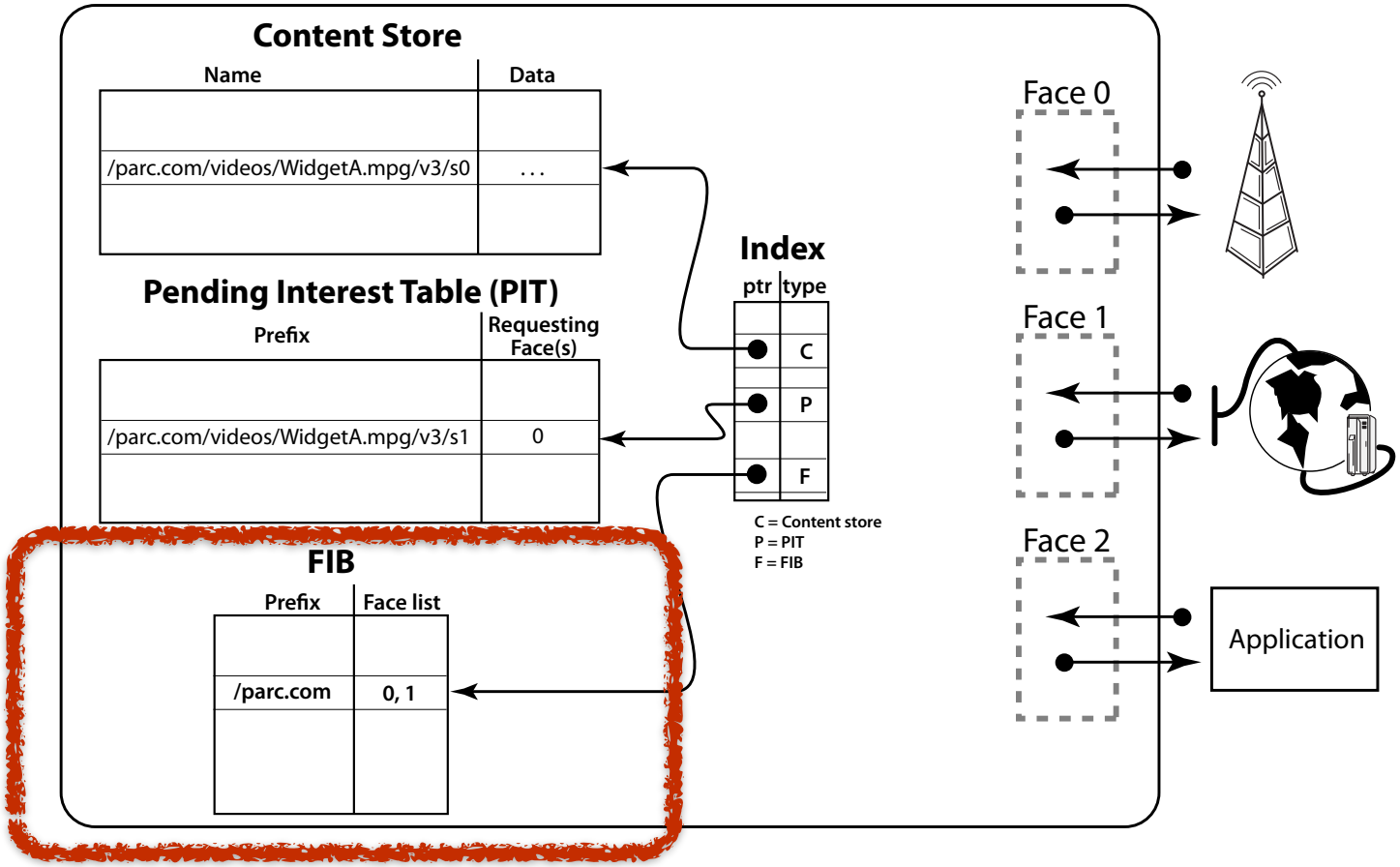
FIB like today's FIB
Longest matching prefix on Names



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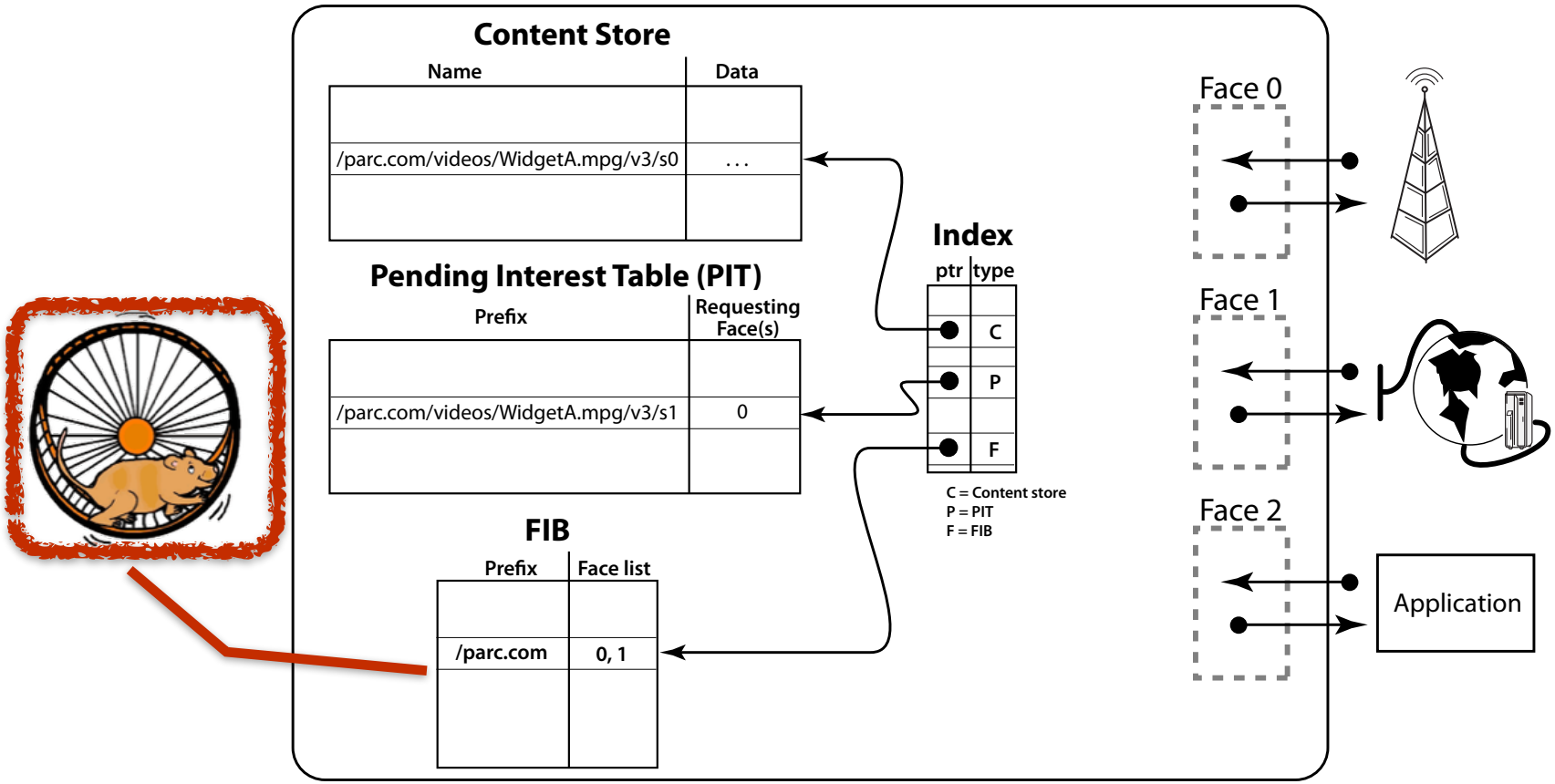
External routing process Manages the FIB



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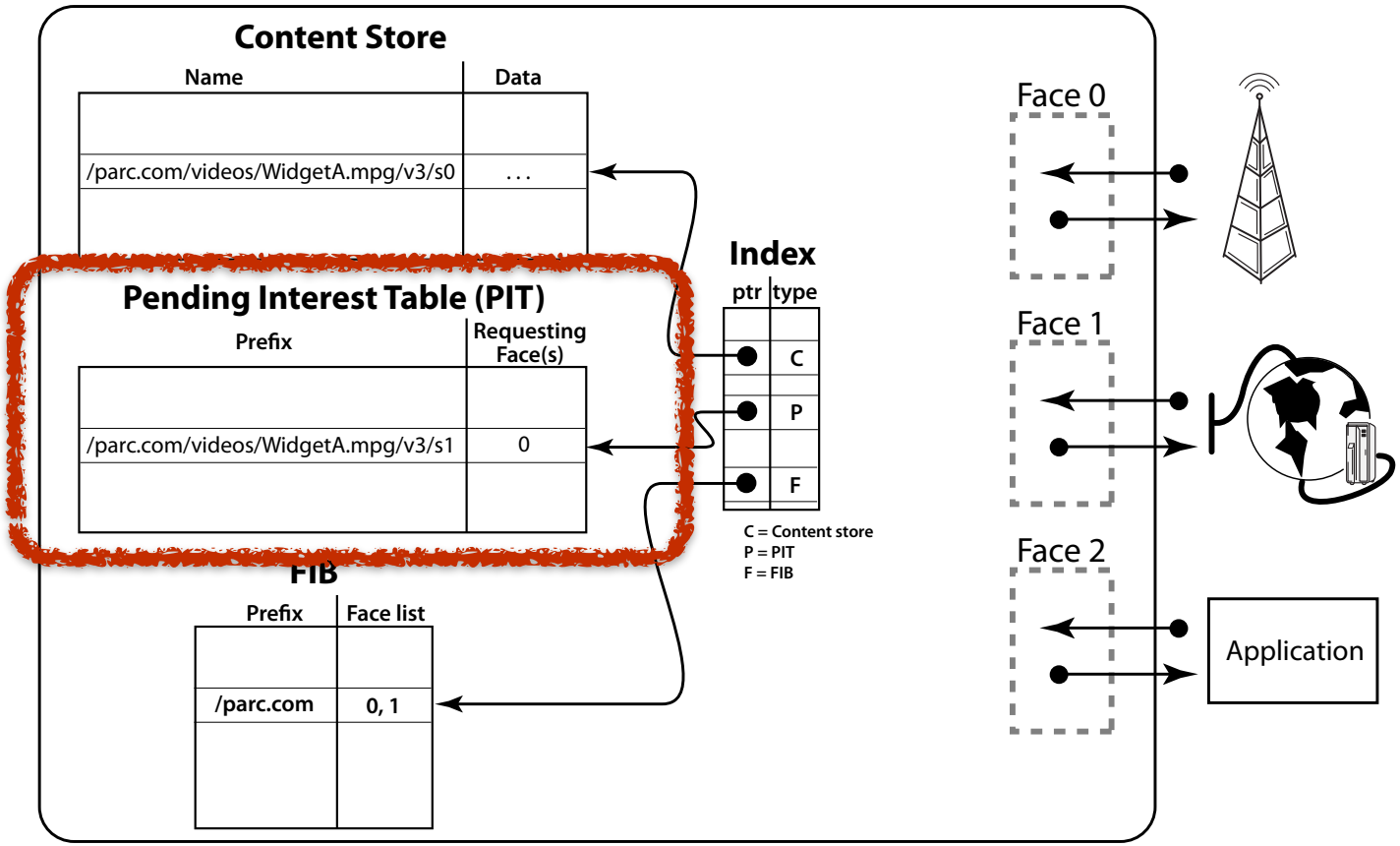
Pending Interest Table (PIT)
State for reverse-path forwarding



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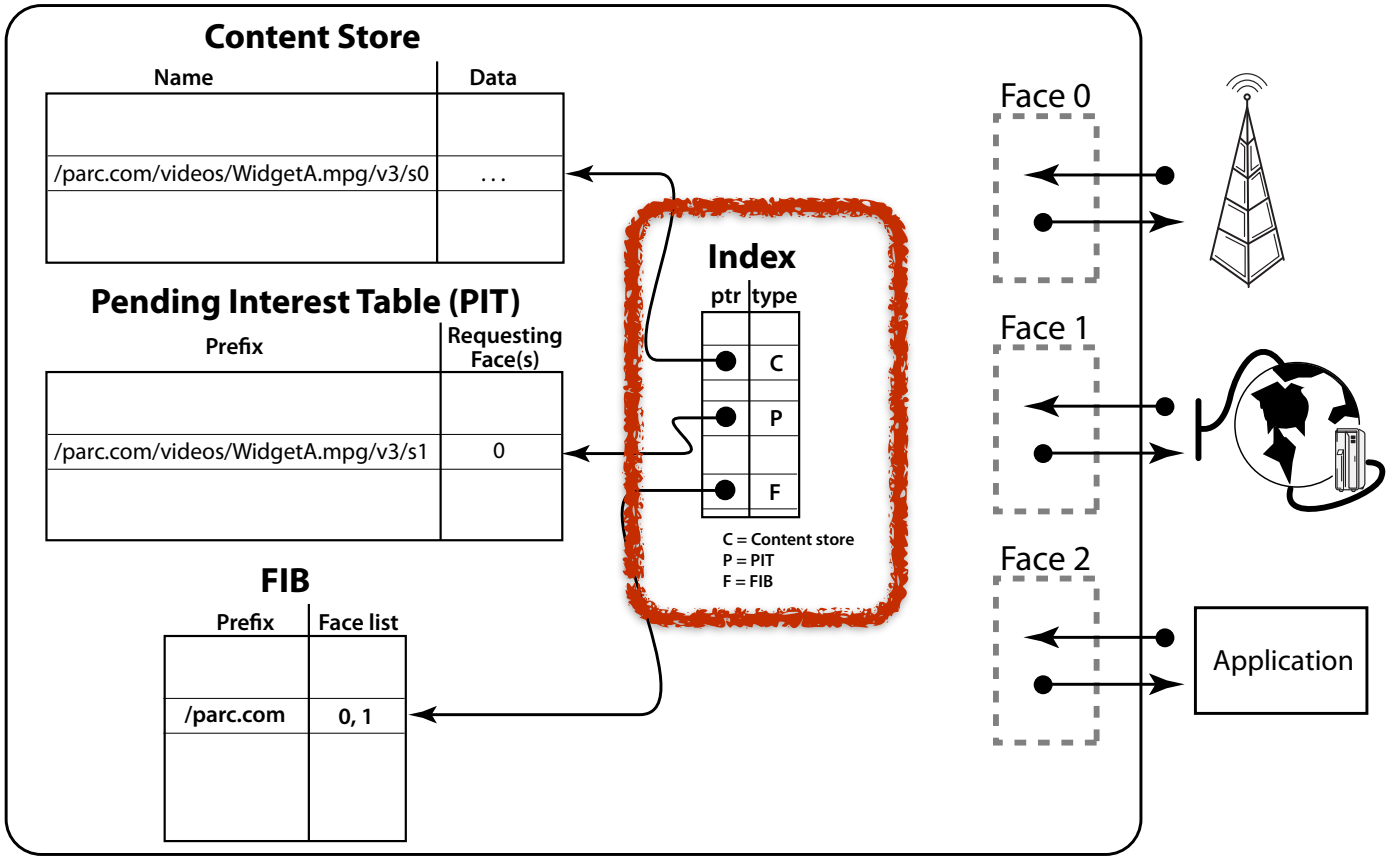
Index
Hash table or other index to tables



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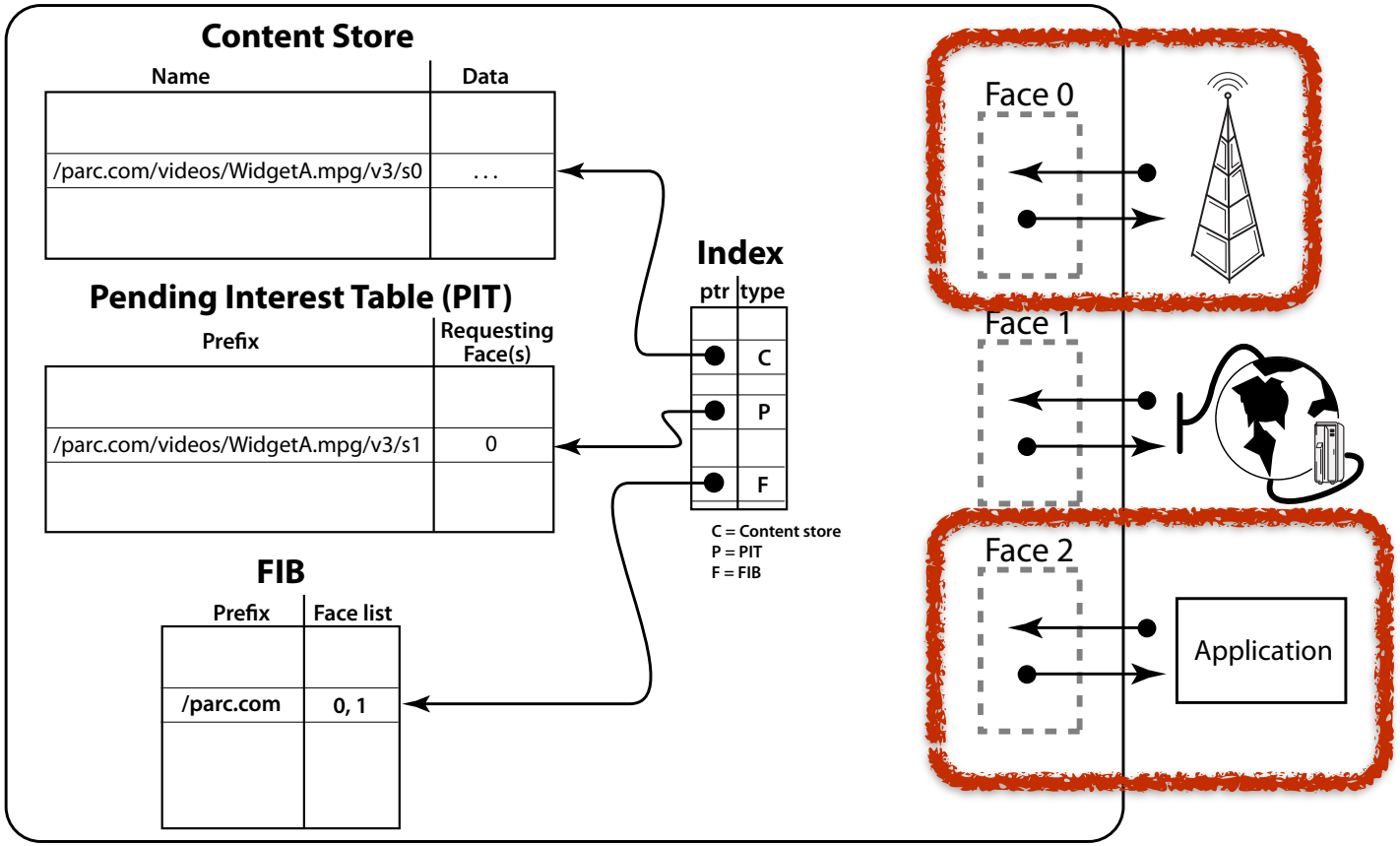
Face
Network interfaces or Applications



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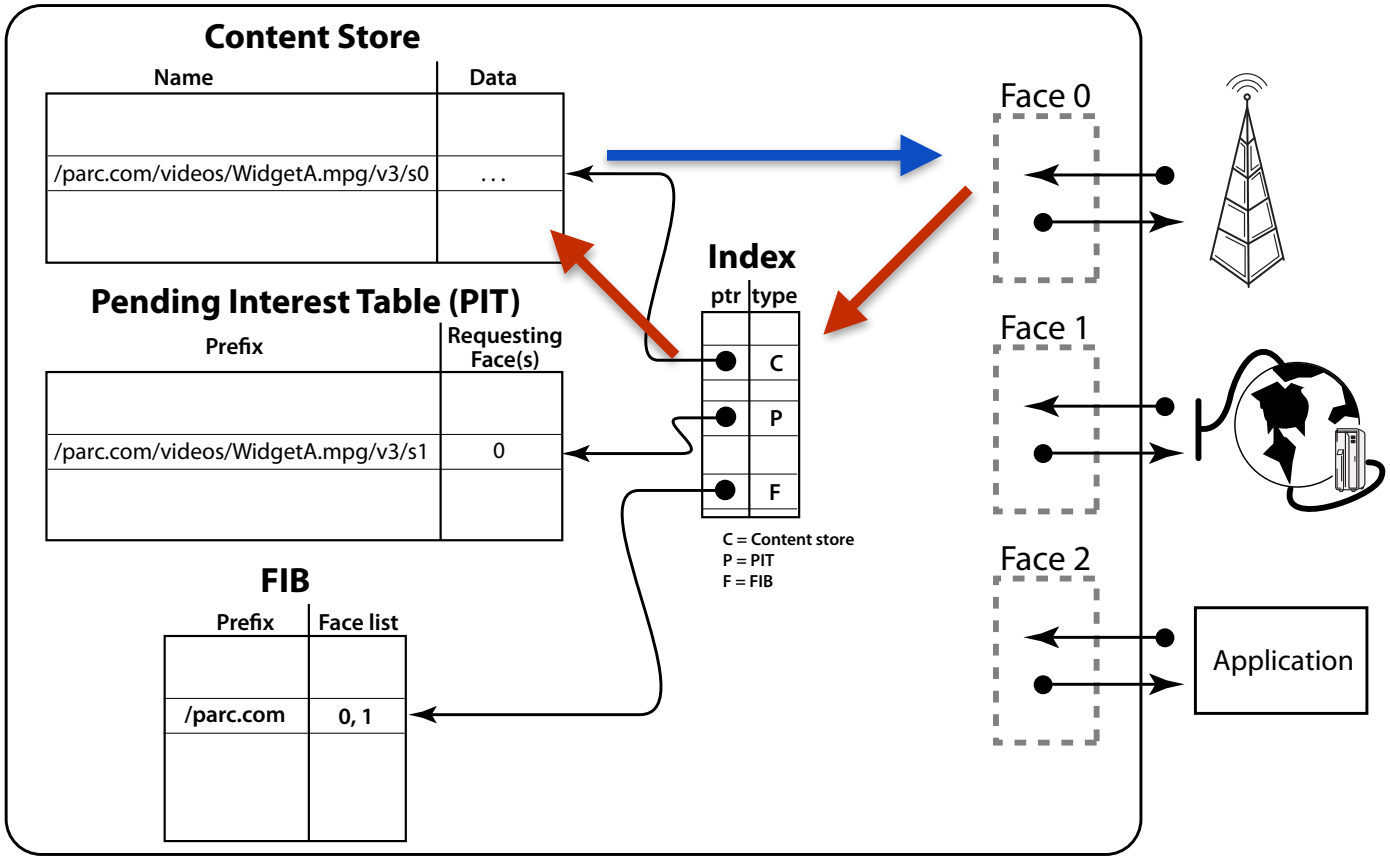
CCN Forwarder Operations

Interest Comes In Satisfied by Cache



/parc.com/videos/WidgetA.mpg/v3/s0
exactly matches what's in the Content Store

Must match Content Object Hash or Verify KeyId

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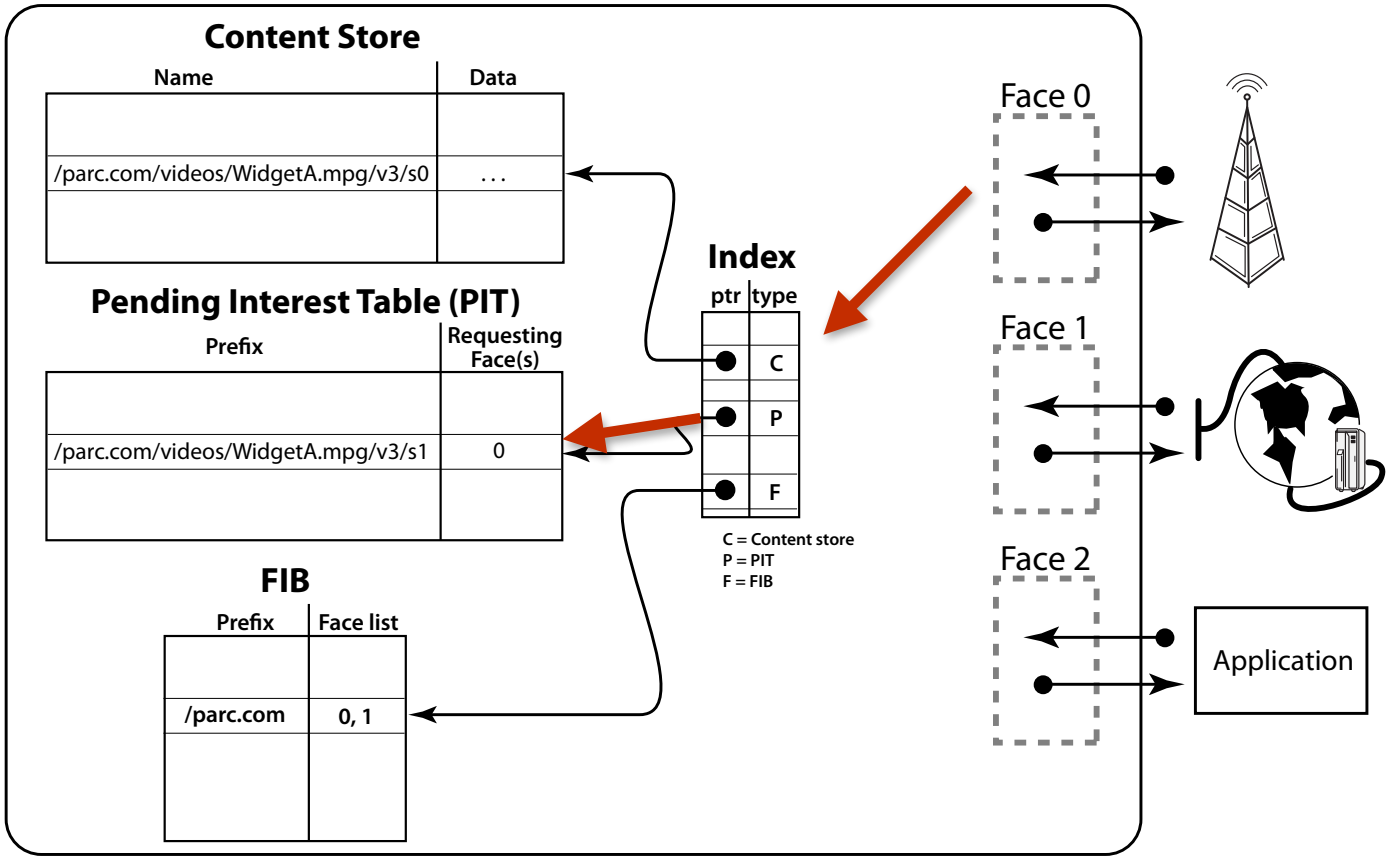
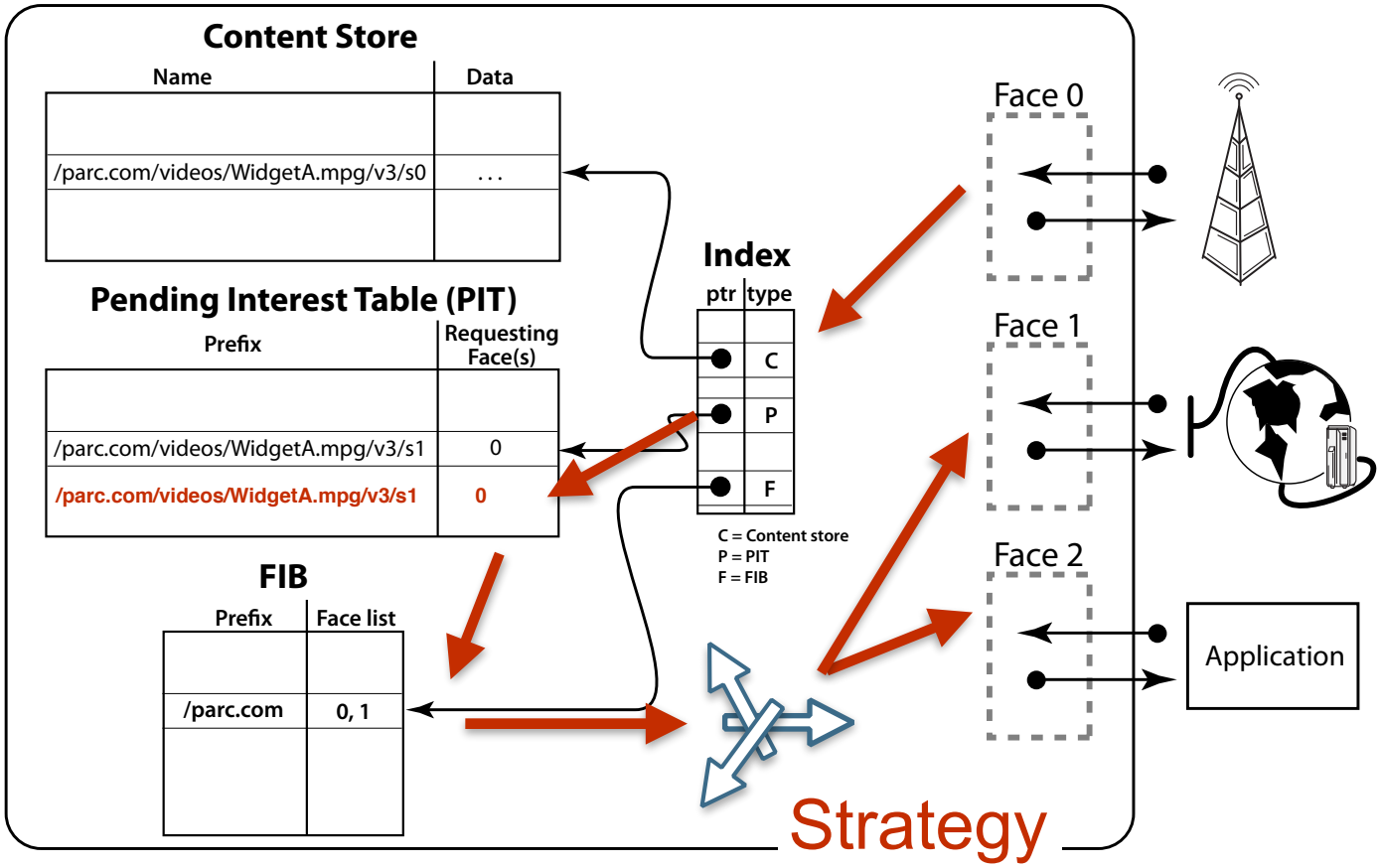
Interest Comes In
Content Store Miss - Already in PIT



/parc.com/videos/WidgetA.mpg/v3/s0
Already in PIT, so suppress duplicate Intrest forwarding

Interest Comes In
Content Store Miss - PIT Miss



Add

Lookup

/parc.com/videos/WidgetA.mpg/v3/s1

Not in PIT, so add an entry, lookup in FIB, forward via Strategy

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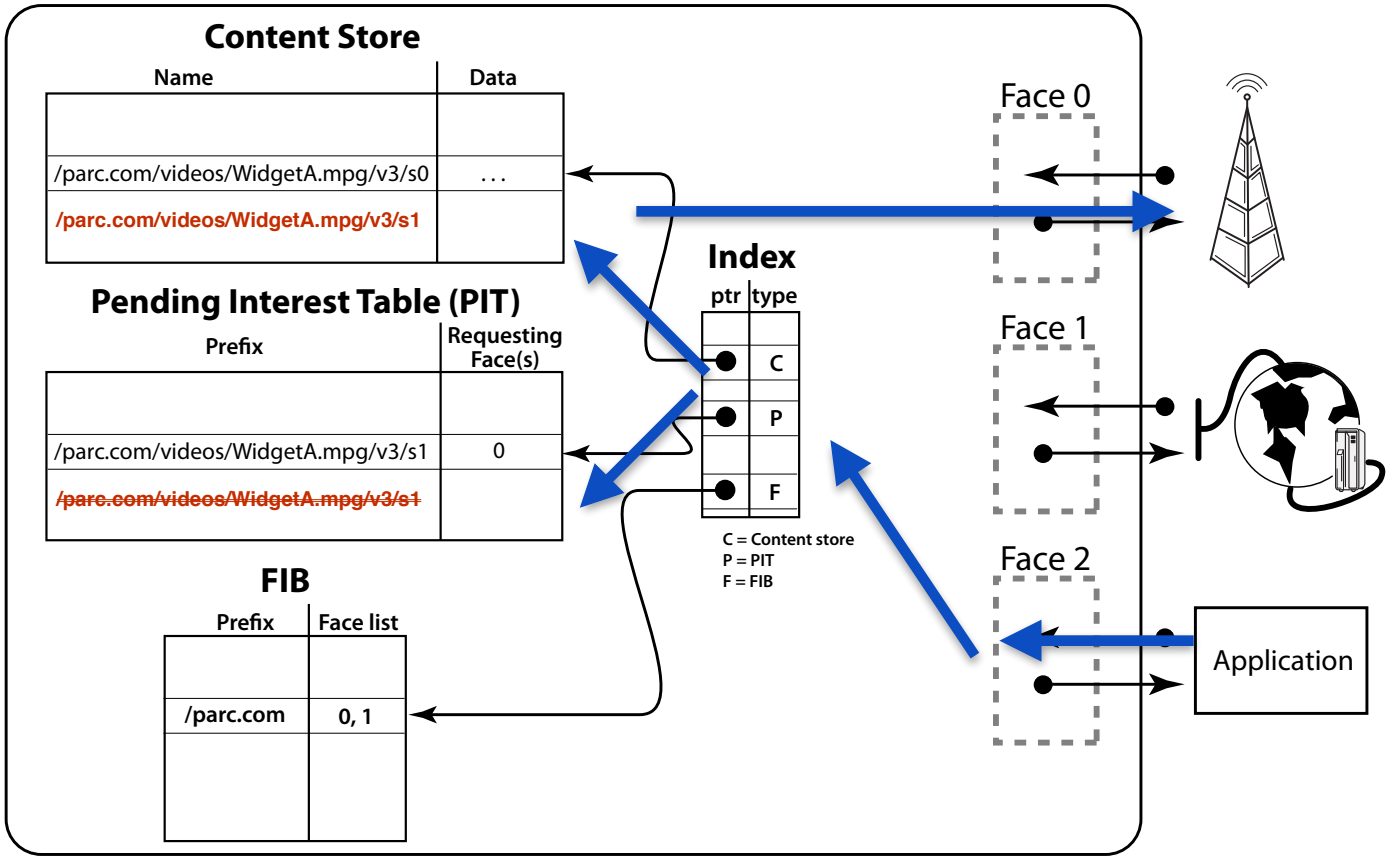
Return Content

Add

Consume



/parc.com/videos/WidgetA.mpg/v3/s1

Match to PIT, store copy in Content Store, Reverse Path forward

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Reverse Path Forwarding

Allows efficient "best path"
with alternate path exploration
and load balancing

Content Store

Off-loads sources for popular content
Retransmission buffer