

Infomax: An Auto-summarizing Information Delivery Protocol

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The Application Landscape



What trends characterize big future shifts in
the application landscape?

The Age of Data

- Ubiquitous digital sources:



Wii



Glucose monitor



Smart Meter



Smart Eyewear



Kinect



Cell-phones



Pulse oximeter



GPS



Smart Sportswear



Smart Watch

The Age of (Democratized) Broadcast

- Ubiquitous digital sources:



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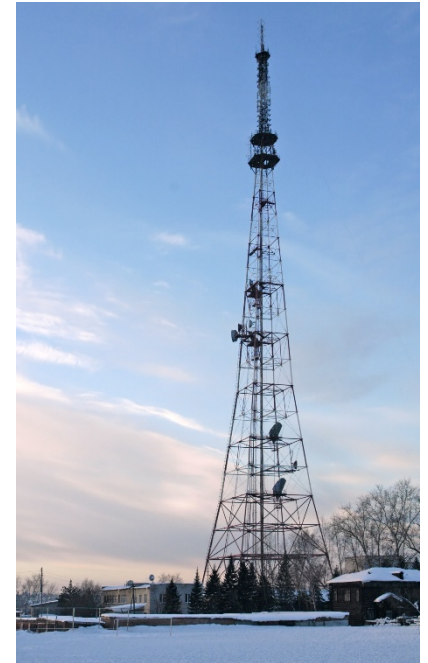
Smart Watch

- Unprecedented dissemination opportunities



The Age of (Democratized) Broadcast

- Broadcast in the 20th century:



The Age of (Democratized) Broadcast

- Broadcast in the 20th century:

- Broadcast today:





Implication

The rate of data production will increasingly outpace application data consumption needs

A Paradigm Shift

Information Retrieval →

Information Distillation



Matching Data
at Sources

TCP (Transport Control)
1 bit sent → 1 bit received

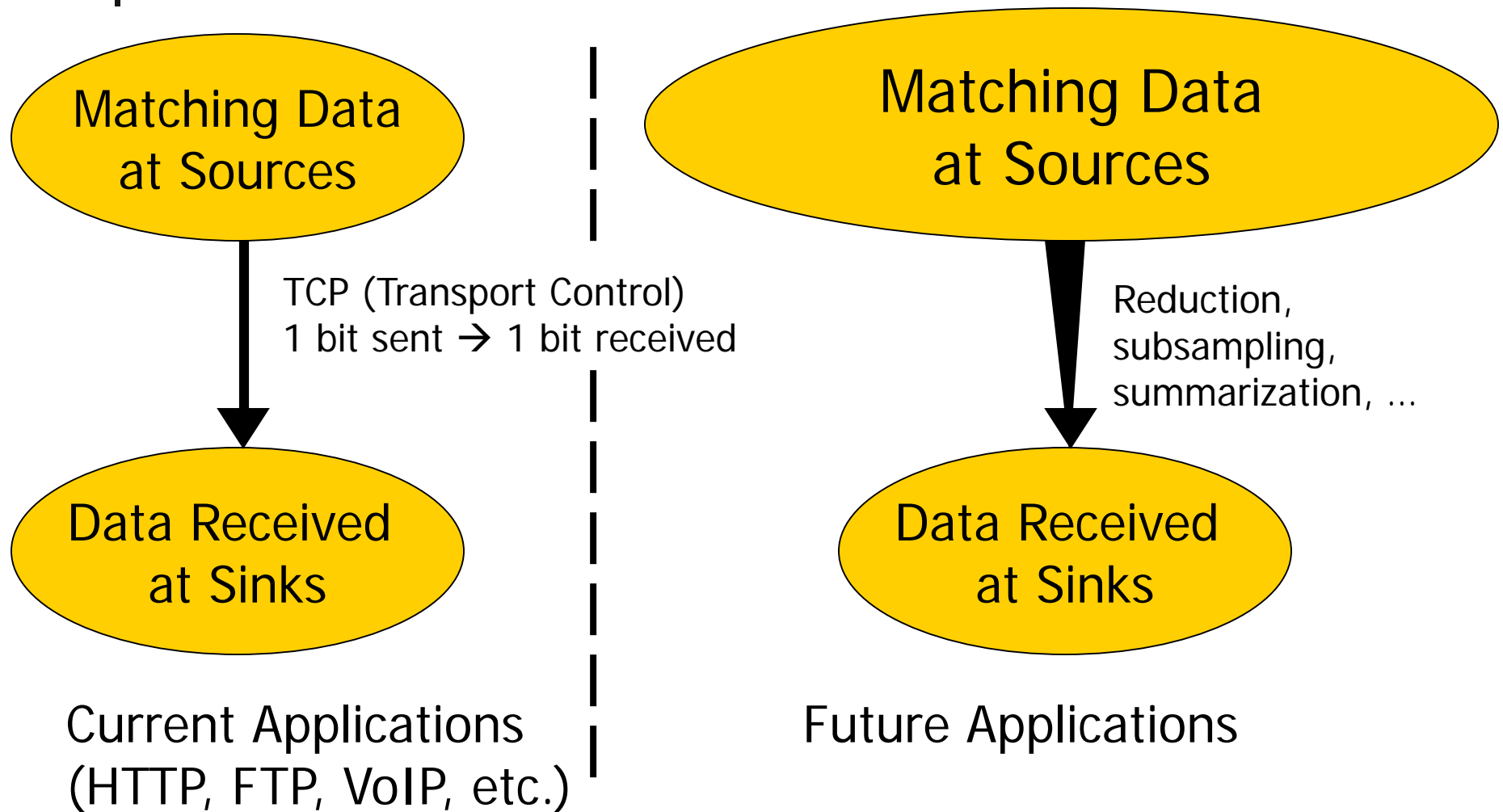
Data Received
at Sinks

Current Applications
(HTTP, FTP, VoIP, etc.)

A Paradigm Shift

Information Retrieval →

Information Distillation



A Paradigm Shift

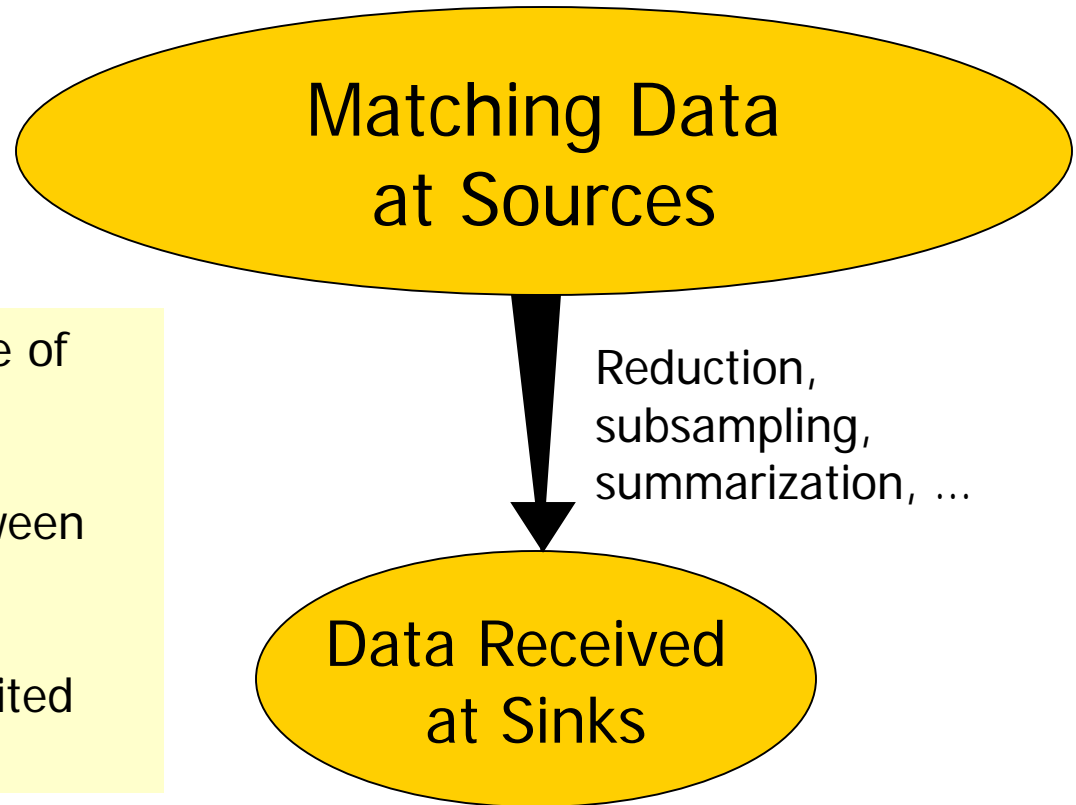
Information Retrieval →

Information Distillation

In NDN, the network is aware of

- (i) application-level object boundaries and
- (ii) topological relations between object names.

This knowledge can be exploited for data volume reduction



Future Applications

A “Transport Layer” Solution



Infomax



Infomax:

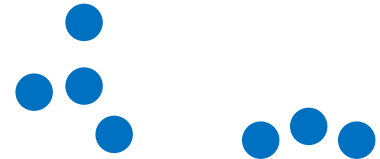
A Novel Data Retrieval API

- Get (*/subtree*)
- Semantics:
 - Retrieve *a representative sampling* of data objects under */subtree*

Infomax:

A Novel Data Retrieval API

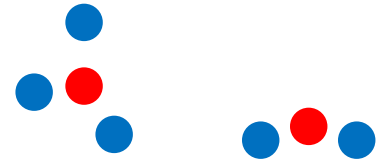
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 - Note 1: Representative sampling
→ minimally redundant



Infomax:

A Novel Data Retrieval API

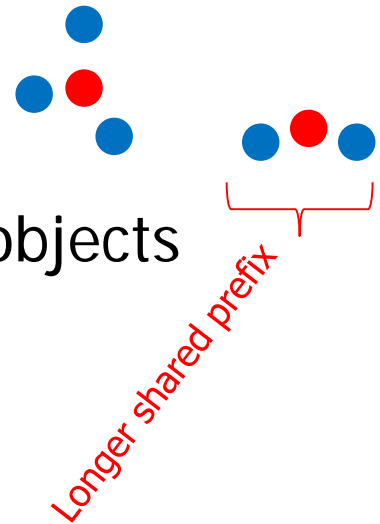
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Infomax:

A Novel Data Retrieval API

- Get (*/subtree*)
- Semantics:
 - Retrieve *a representative sampling* of data objects under */subtree*
 - Note 1: Representative sampling
→ minimally redundant
 - Note 2: Longer shared prefix between objects
→ more semantic redundancy





A Content Transmission Prioritization Policy

Least shared prefix first



A Content Transmission Prioritization Policy

Least shared prefix first

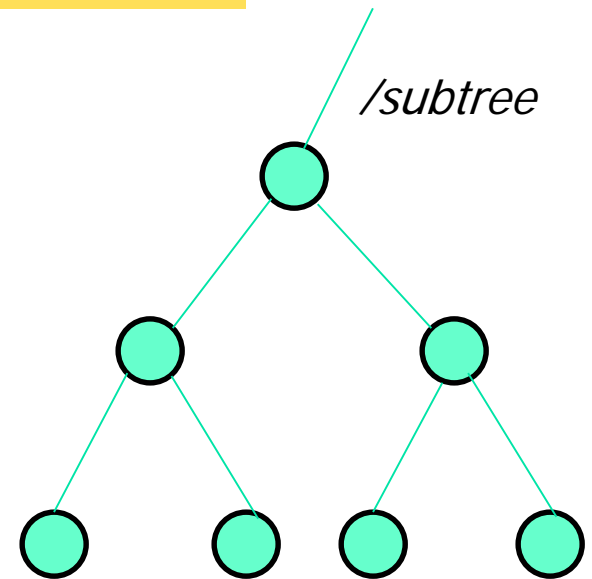
Tie? Take leftmost branch

A Content Transmission Prioritization Policy

Least shared prefix first

Tie? Take leftmost branch

Note: Reduces approximately a breadth-first traversal of the content under */subtree*

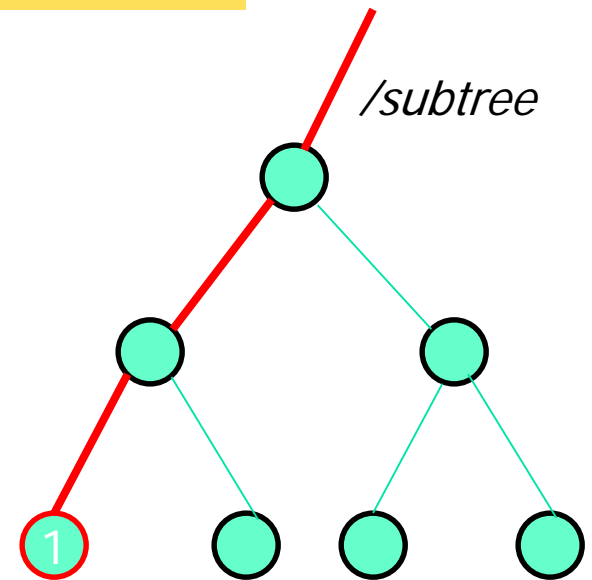


A Content Transmission Prioritization Policy

Least shared prefix first

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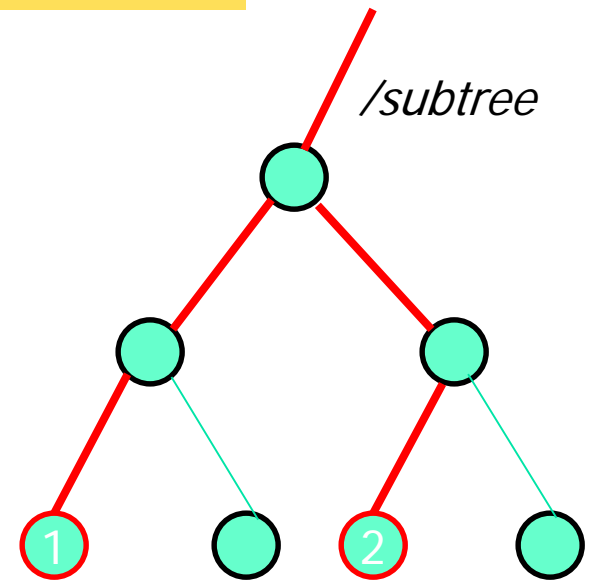


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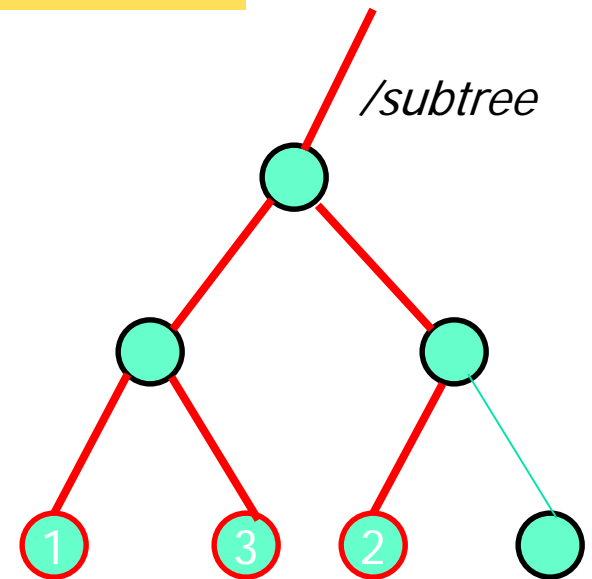


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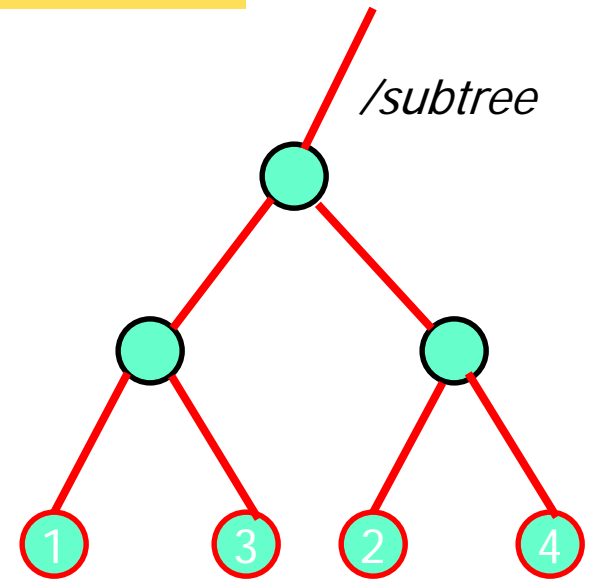


A Content Transmission Prioritization Policy

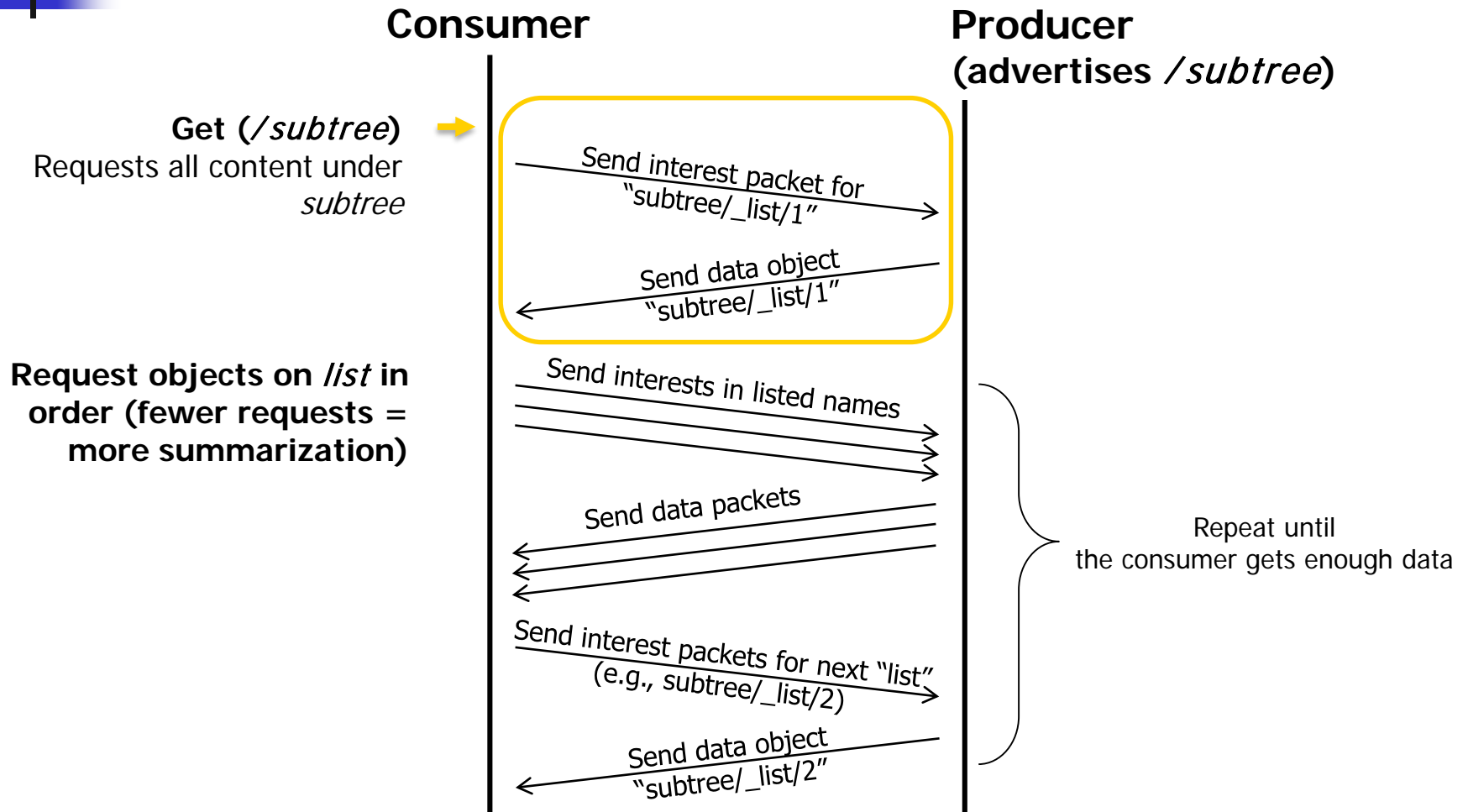
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Protocol Design



Evaluation

- Currently, evaluation is underway on testbed.

