

# StreamGlobe: P2P Stream Sharing

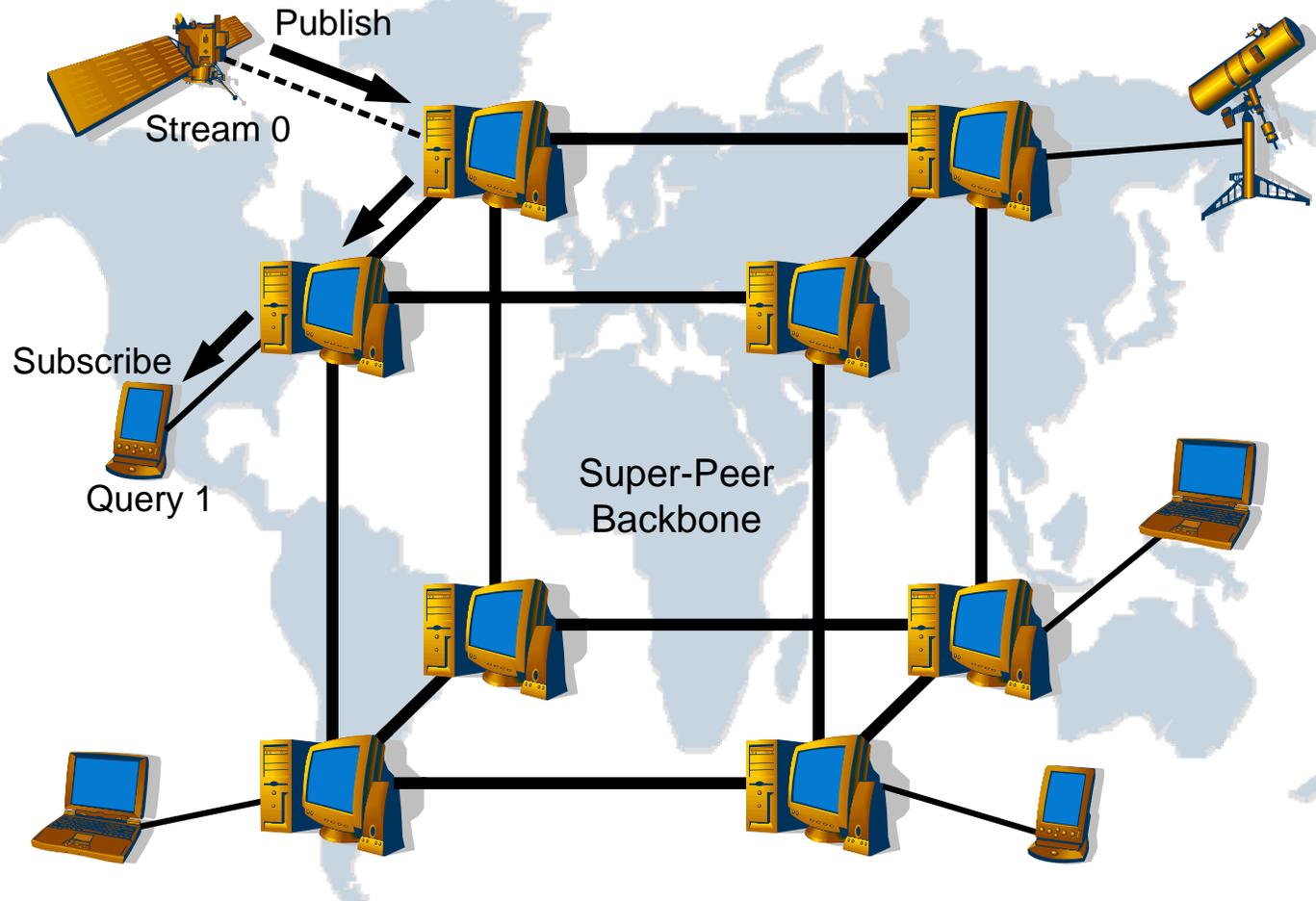


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# Publish & Subscribe in a P2P Network

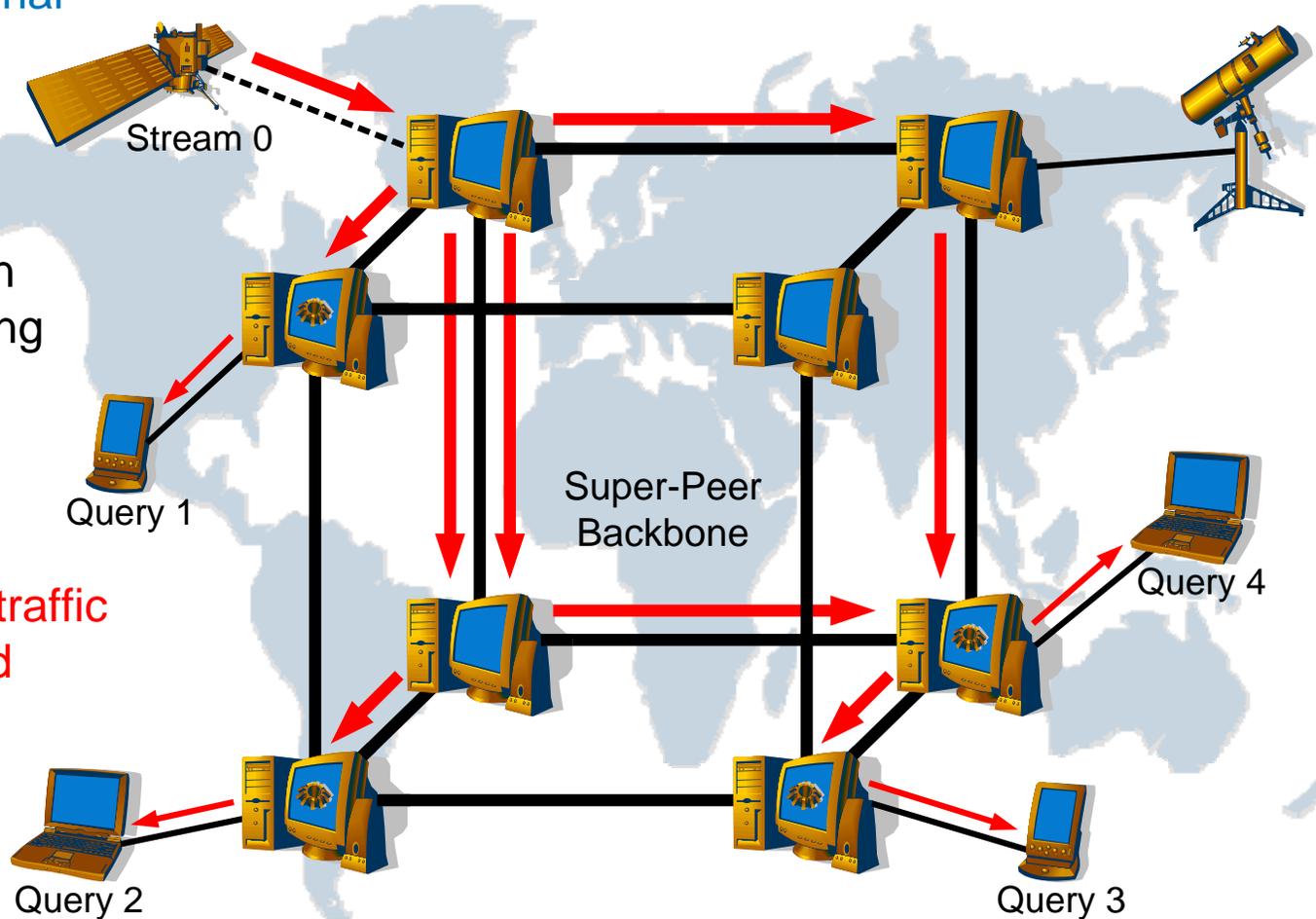


# Traditional Approach without Stream Sharing

Deficiencies of traditional approach:

- Redundant transmission of data streams
- Redundant execution of stream transforming operators
- Transmission of unnecessary data

⇒ Increased network traffic  
 ⇒ Increased peer load

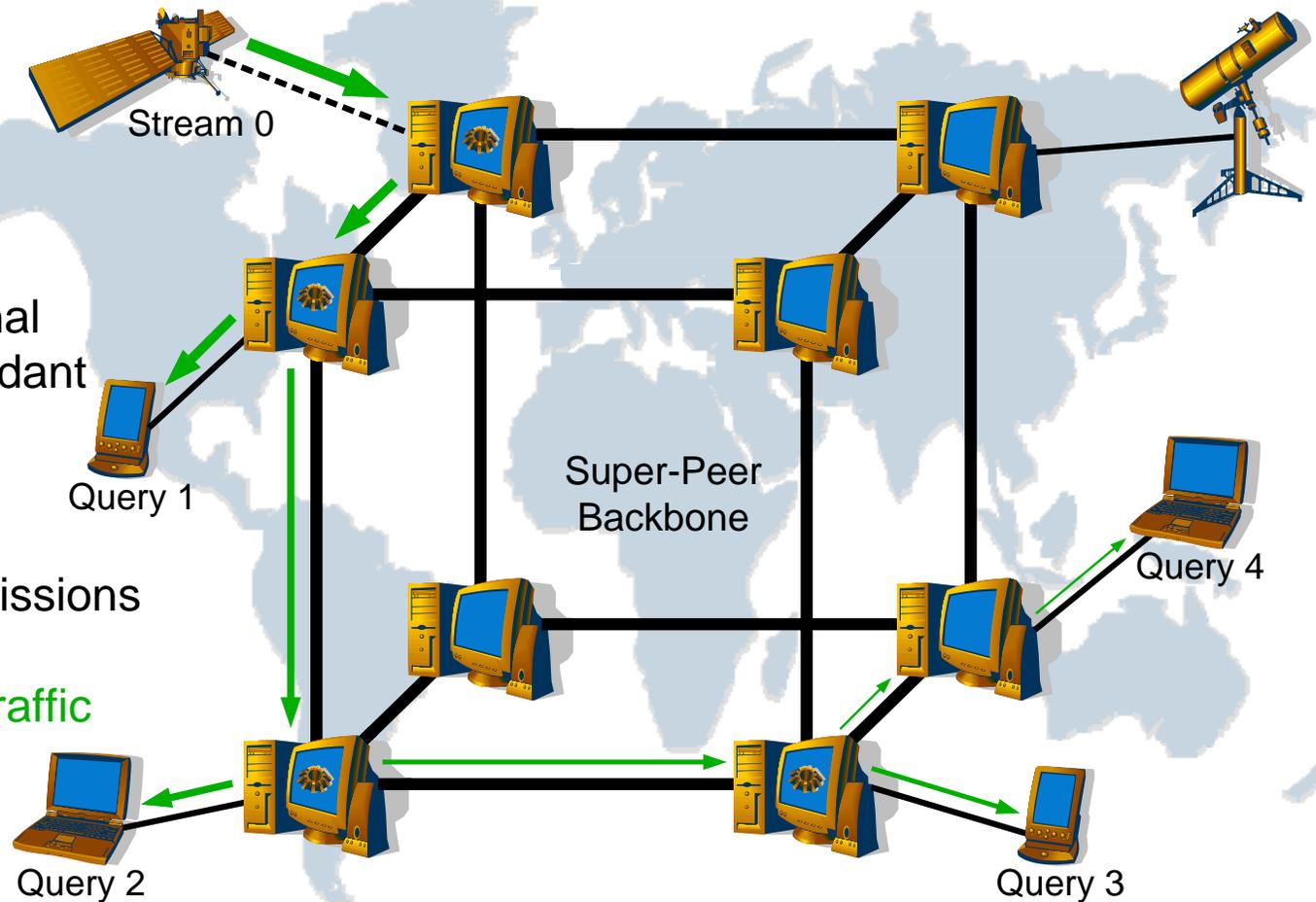


# StreamGlobe Approach using Stream Sharing

## Benefits of StreamGlobe approach:

- Stream sharing avoids redundant data stream transmissions
- Sharing computational results avoids redundant computations
- Early filtering and aggregation avoid unnecessary transmissions

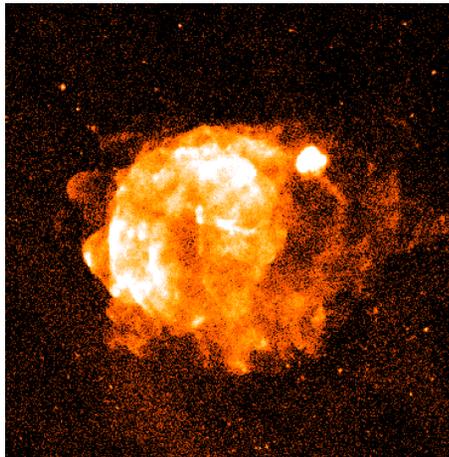
- ⇒ Reduced network traffic
- ⇒ Reduced peer load



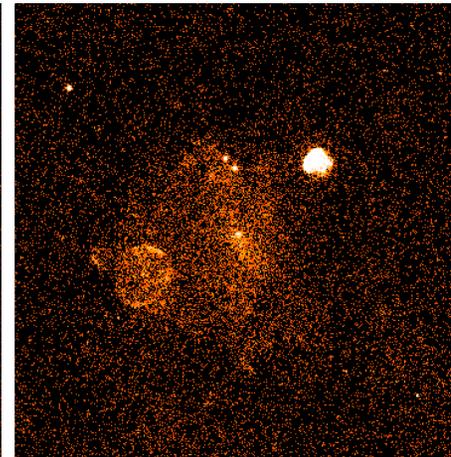
# Demonstration Outline

- Publish & Subscribe to data streams in a Grid-based P2P Data Stream Management System
- Optimization using data stream sharing
- Prevention of overload situations
- Throughput experiments
- Various network topologies and scenarios
- Real astrophysical data (ROSAT All Sky Survey (RASS) and others)

Vela  
Supernova  
Remnant



RXJ0852.0-4622  
Supernova  
Remnant



# Demonstration Times

## Group 2: P2P Based Systems

- Tuesday 14:00-15:30
- Thursday 14:00-15:30

StreamGlobe - (Traditional)

File View Configuration Engine

- PEERS
  - CPU usage (%): 5.64
  - URL: http://127.0.0.1:9090/ogsa
  - Peer6
    - CPU usage (%): 2.95
    - URL: http://127.0.0.1:9090/ogsa
  - Peer7
    - CPU usage (%): 1.64
    - URL: http://127.0.0.1:9090/ogsa
- Connections
- Queries
  - query-0
    - (M)XQuery

```

query-0
-----
<photons>
{
  for $p in stream("stream-0")/photons/photon
  where $p/coord/cel/ra >= 120
    and $p/coord/cel/ra <= 138
    and $p/coord/cel/dec >= -49
    and $p/coord/cel/dec <= -40
  return
    <vela_photon>
      ($p/coord/cel/ra) ($p/coord/cel/dec)
      ($p/phc) ($p/en) ($p/det-time)
    </vela_photon>
}
</photons>
    
```

The network diagram shows a central 'stream-0' node connected to several peers (Peer 0 to Peer 7). Connections are color-coded: green for active and orange for inactive. A red dashed line highlights a specific path through the network.

StreamGlobe - (Traditional)

File View Configuration Engine

- Traffic (->): 0
- Traffic (<-): 0
- Peer4 -- Peer3
  - Total Traffic (bps): 29463
  - Traffic (->): 29463
  - Traffic (<-): 0
- Peer5 -- Peer4
  - Total Traffic (bps): 57243
  - Traffic (->): 0
  - Traffic (<-): 57243
- Peer6 -- Peer3
- Peer7 -- Peer3

Queries

- Streams
  - stream-0

```

stream-0
-----
<IELEMENT photons (photon)* >
<IELEMENT photon (coord, phc, en, det-time)>
<IELEMENT coord (cel, det)>
<IELEMENT cel (ra, dec)>
<IELEMENT ra (#PCDATA)>
<IELEMENT dec (#PCDATA)>
<IELEMENT det (dx, dy)>
<IELEMENT dx (#PCDATA)>
<IELEMENT dy (#PCDATA)>
<IELEMENT phc (#PCDATA)>
<IELEMENT en (#PCDATA)>
<IELEMENT det-time (#PCDATA)>
    
```

The network diagram shows a more complex network structure with many peers connected to a central 'stream-0' node. Connections are color-coded: green for active and orange for inactive. A red dashed line highlights a specific path through the network.