

Distributed Computing

Will Scott

Context

Distributed Hash Tables

Hash Table

Scenario

College

Location

Telephone

Web Page

Mascot

Visiting

Scenario

College

Location

Telephone

Web Page

Mascot

Visiting

Harvey Mudd

California

(909)621-8000

<http://hmc.edu>

Wally

Currently

Scenario

College

Location

Telephone

Web Page

Mascot

Visiting

Harvey Mudd

California

(909)621-8000

<http://hmc.edu>

Wally

Currently

Scenario

Harvey Mudd

California
(909)621-8000
<http://hmc.edu>

Wally
Currently

Pomona

California
(909)621-8137
<http://pomona.edu>

Cecil
No

CalTech

California
(626)395-6811
<http://caltech.edu>

Beaver
No

Scenario

CalTech

Harvey Mudd

Pomona

California

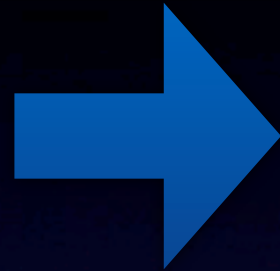
(909)621-8137

<http://pomona.edu>

Cecil

No

Scenario



CalTech

Harvey Mudd

Pomona

California

(909)621-8137

<http://pomona.edu>

Cecil

No

Hash Table



1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Hash Table

Harvey Mudd

California
(909)621-8000

<http://hmc.edu>

Wally

Currently

Hash

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

[illegible]

Hash Table

Harvey Mudd

California
(909)621-8000
<http://hmc.edu>

Wally Currently



1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Hash Table



1	Mudd
2	
3	
4	
5	
6	
7	
8	
9	
10	

Hash Table

Pomona

California
(909)621-8137

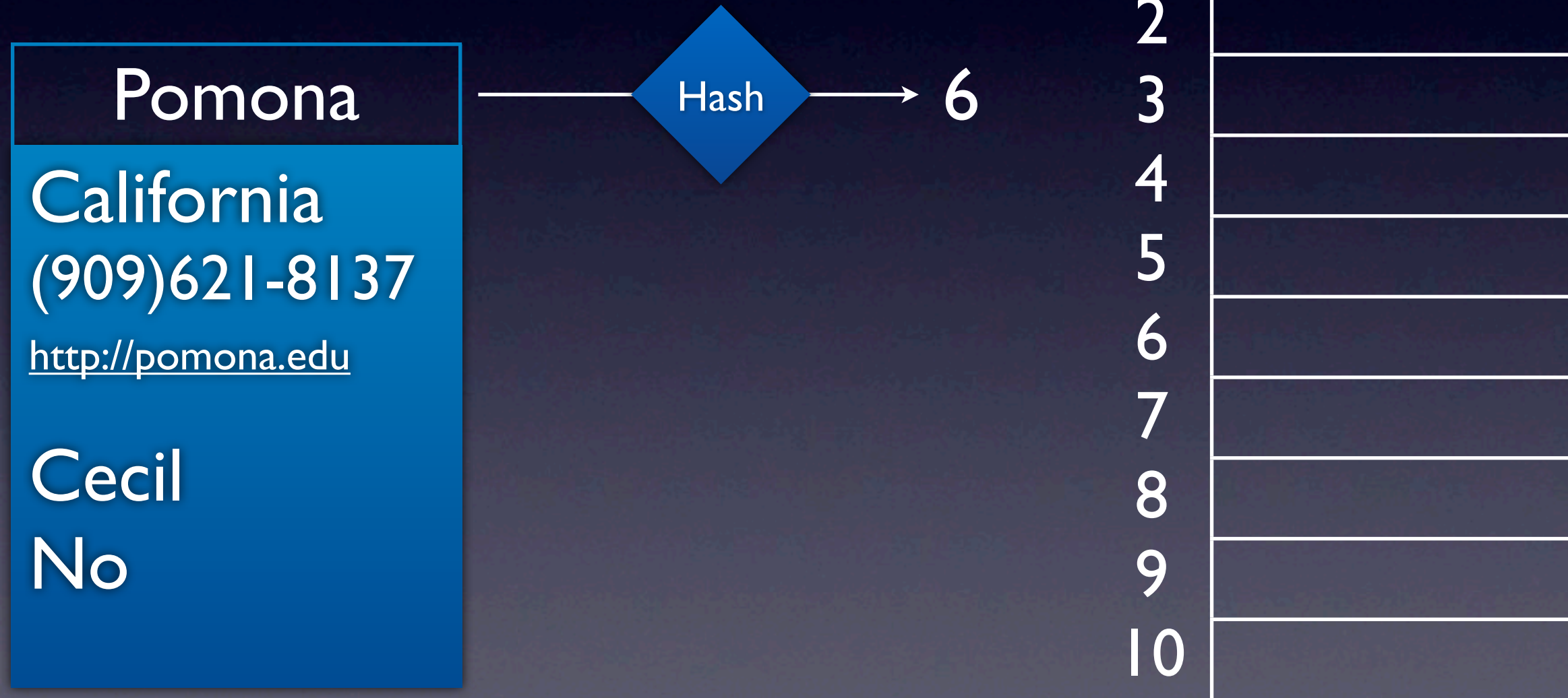
<http://pomona.edu>

Cecil
No

Hash

1	Mudd
2	
3	
4	
5	
6	
7	
8	
9	
10	

Hash Table



Hash Table



1	Mudd
2	
3	
4	
5	
6	Pomona
7	
8	
9	
10	

Hash Table



1	Mudd
2	
3	MIT
4	
5	CMU
6	Pomona
7	Cal Tech
8	
9	
10	

Hash Table

Harvey Mudd



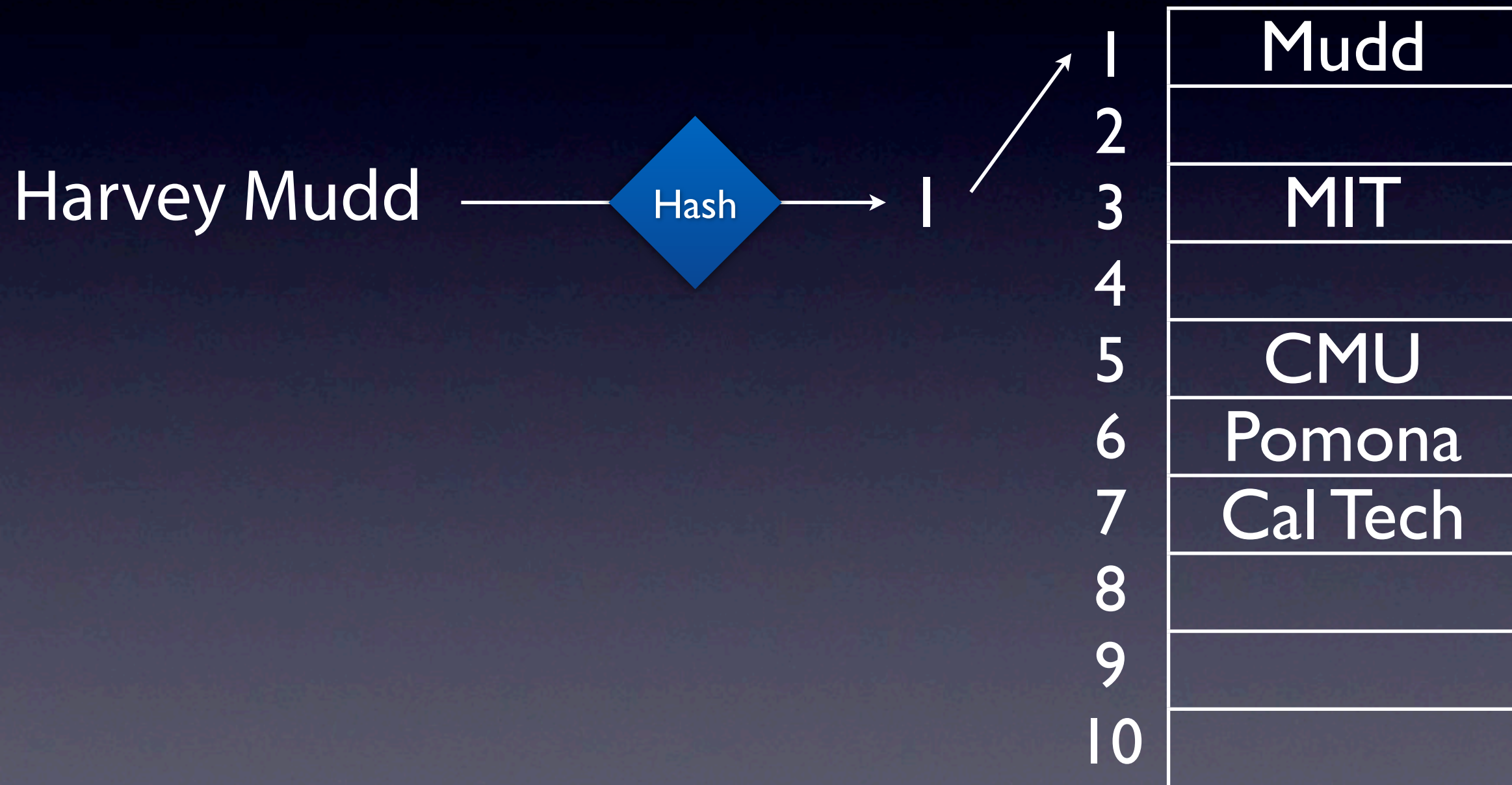
1	Mudd
2	
3	MIT
4	
5	CMU
6	Pomona
7	Cal Tech
8	
9	
10	

Hash Table



1	Mudd
2	
3	MIT
4	
5	CMU
6	Pomona
7	Cal Tech
8	
9	
10	

Hash Table



Issues

- Hash Collisions
- Resizing

Distributed Hash Tables (DHTs)

Distributed Hash Tables (DHTs)

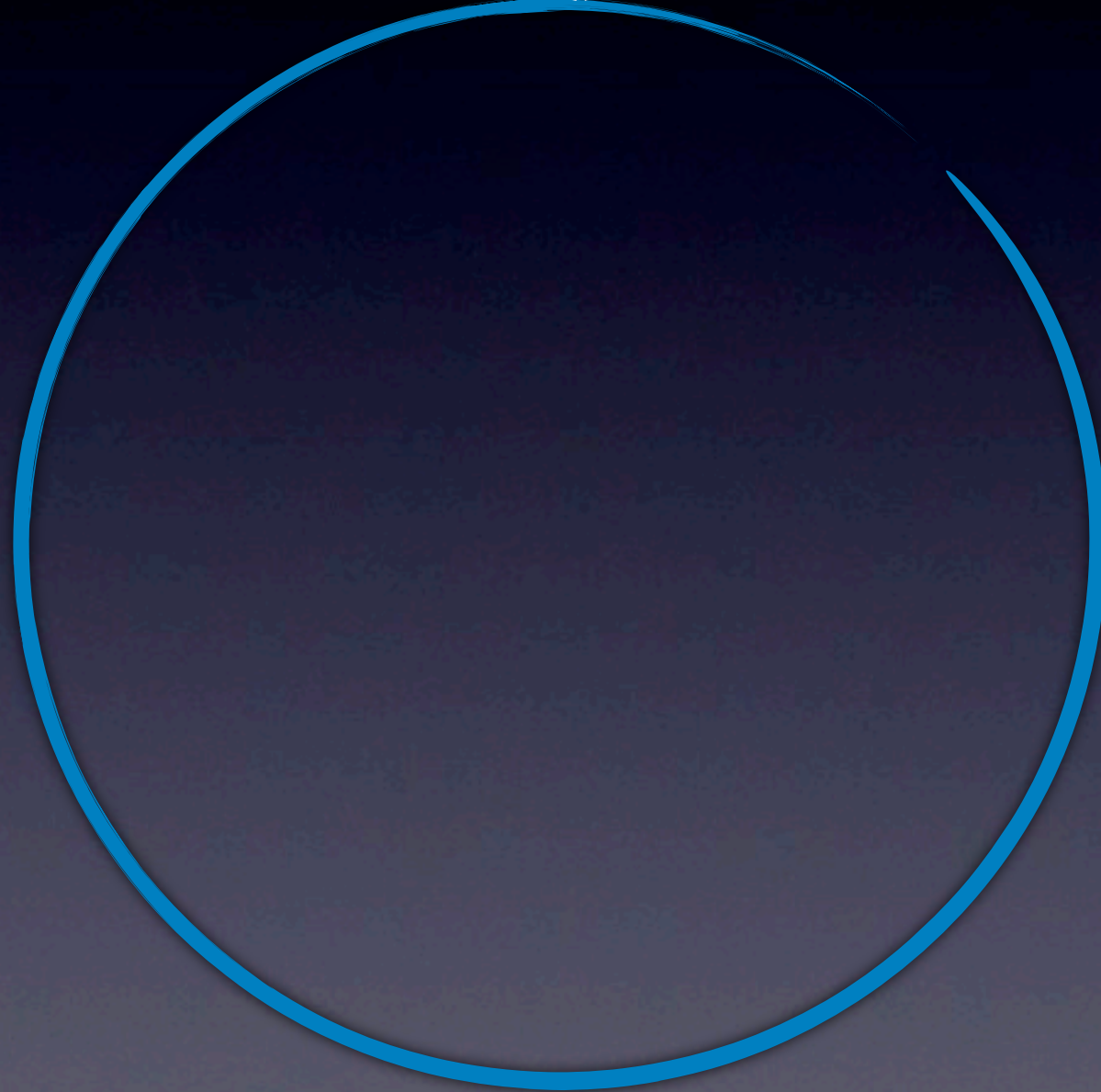
Why?

DHTs

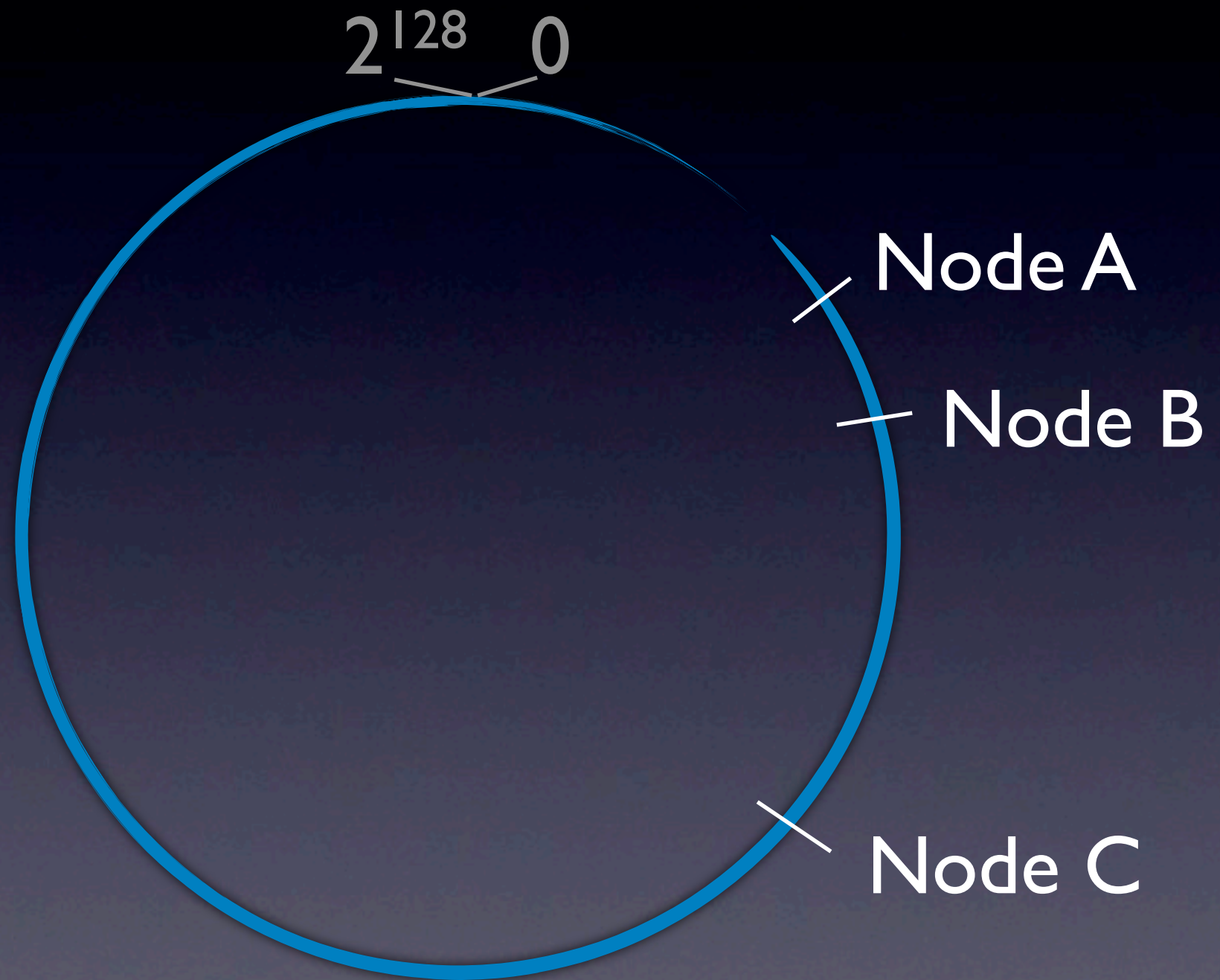
- Lots of Data
- Fault Tolerance
- Minimal Overhead
- Reasonable Speed

DHTs

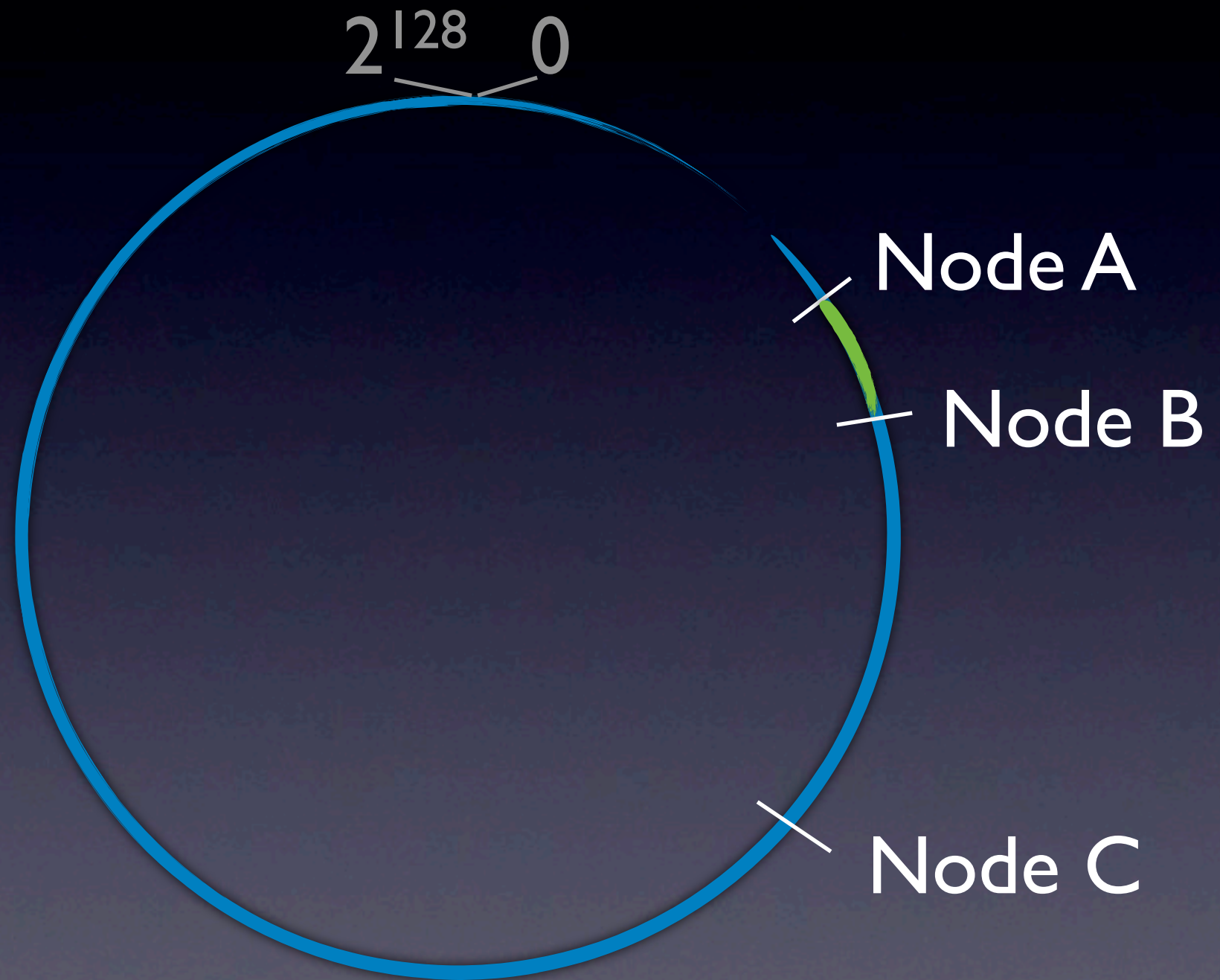
2^{128} 0



DHTs



DHTs



Kademlia

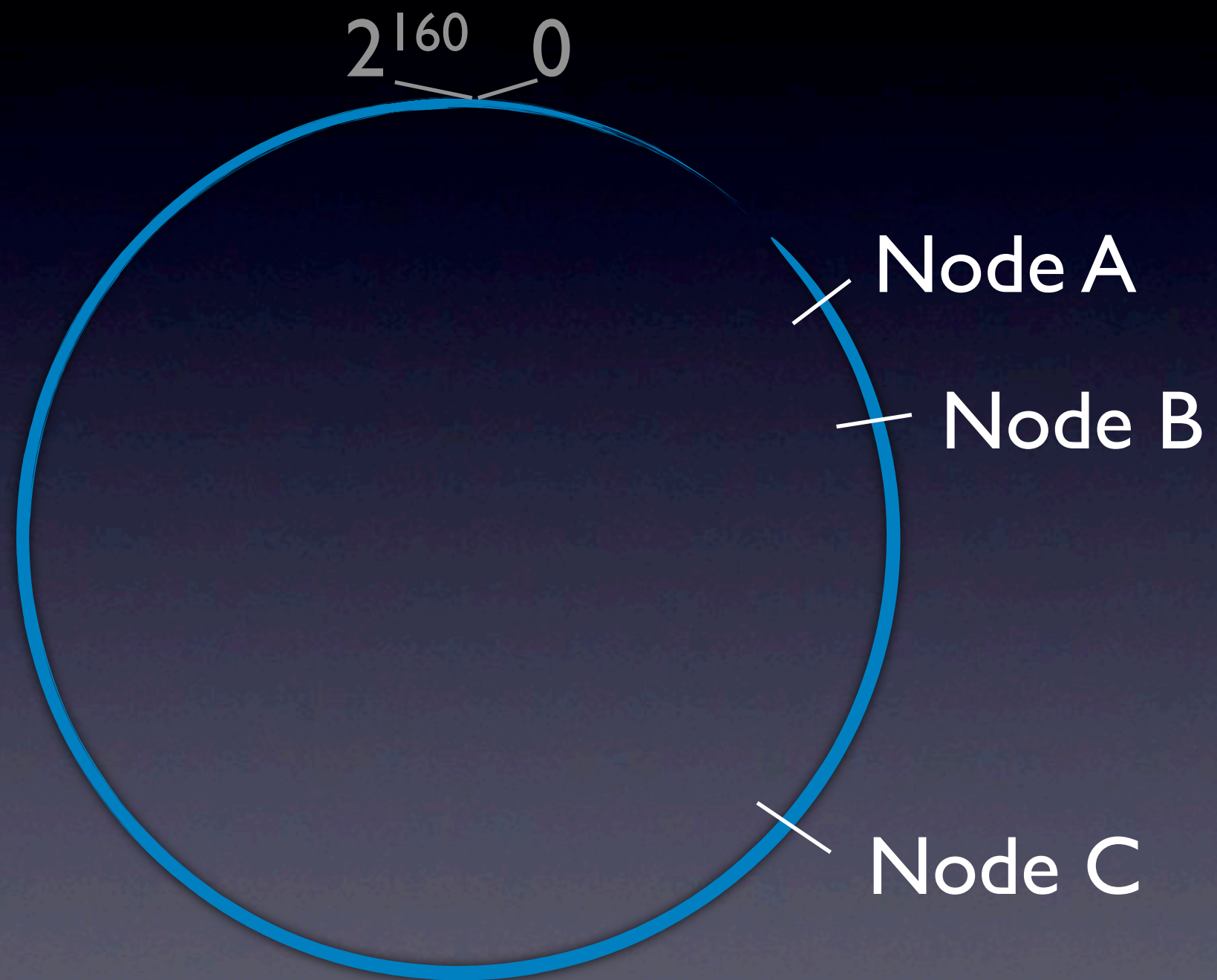
Kademlia

- Developed for Overnet
- Used in BitTorrent
- Most Widely Implemented

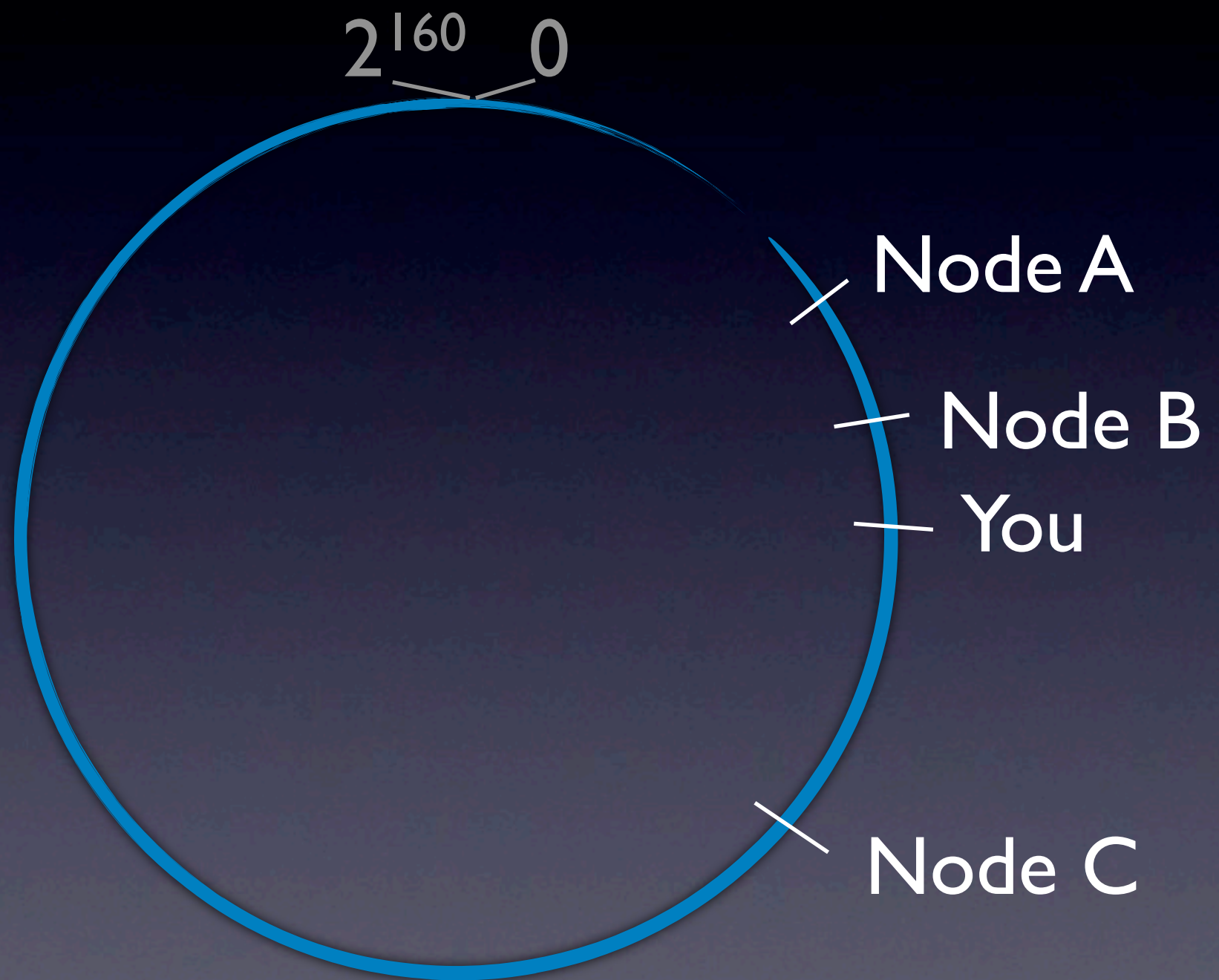
Kademlia

- Developed for Overnet
- Used in BitTorrent
- Most Widely Implemented

Mainline DHT

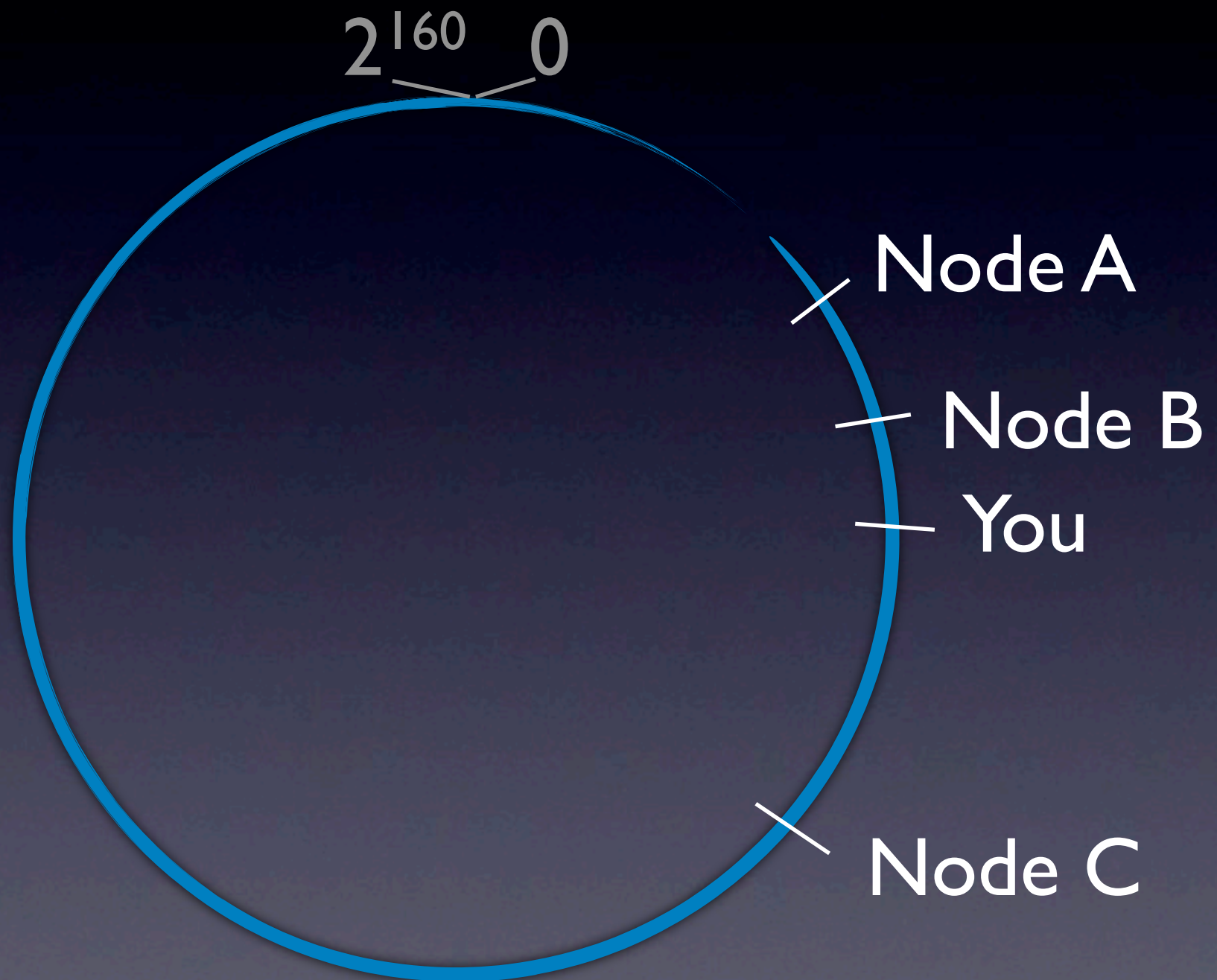


Joining

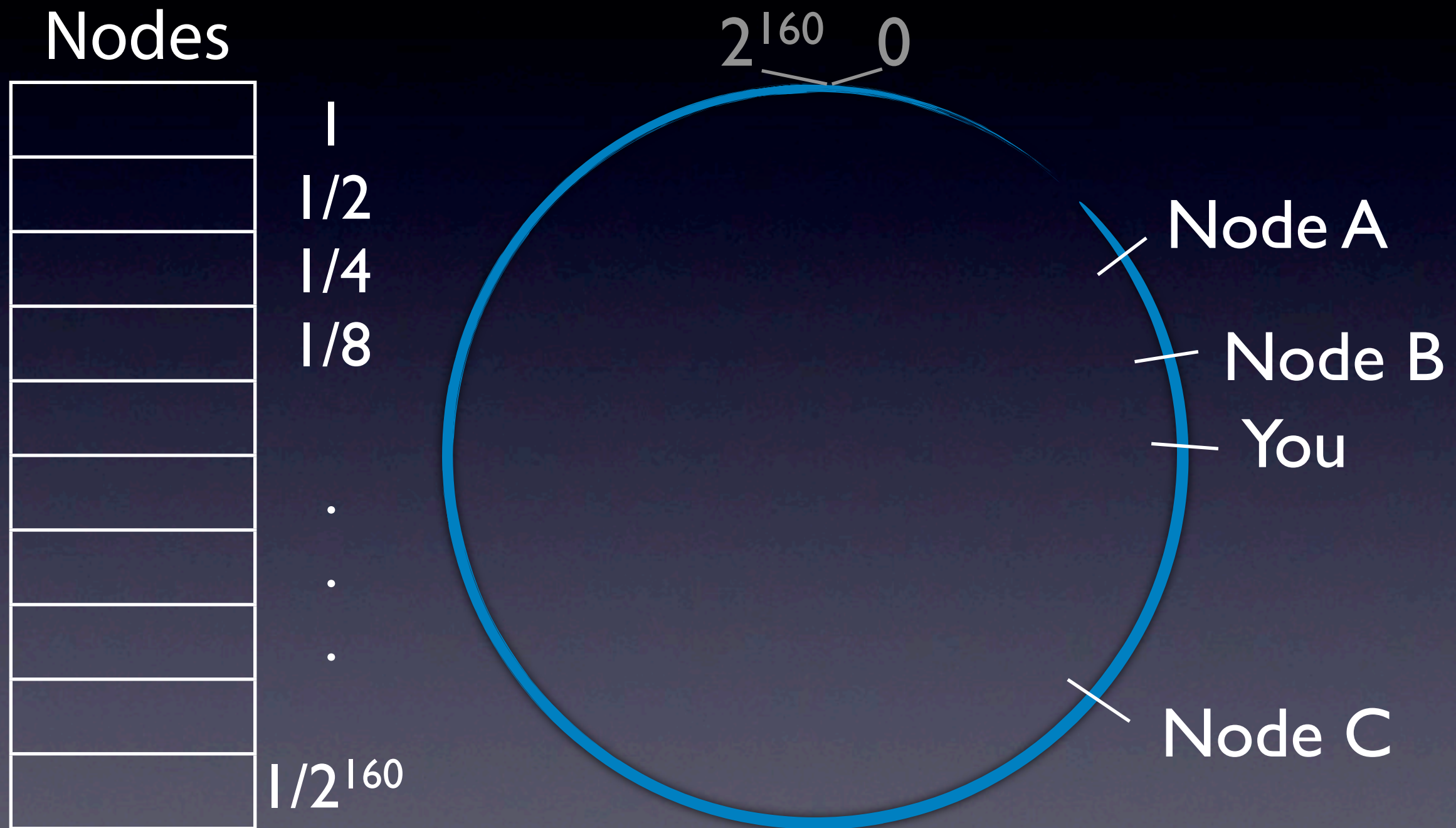


Joining

Nodes

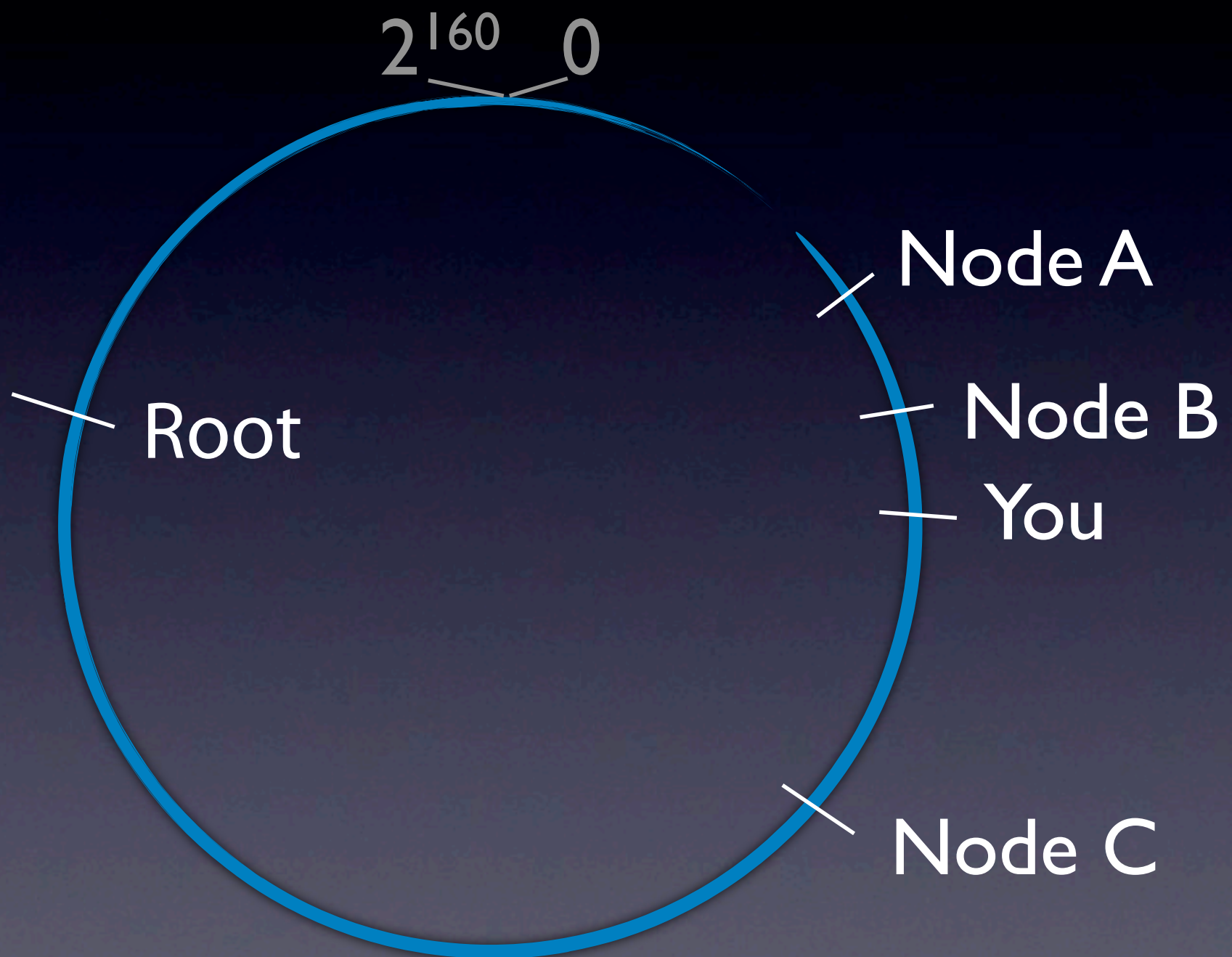


Joining



Joining

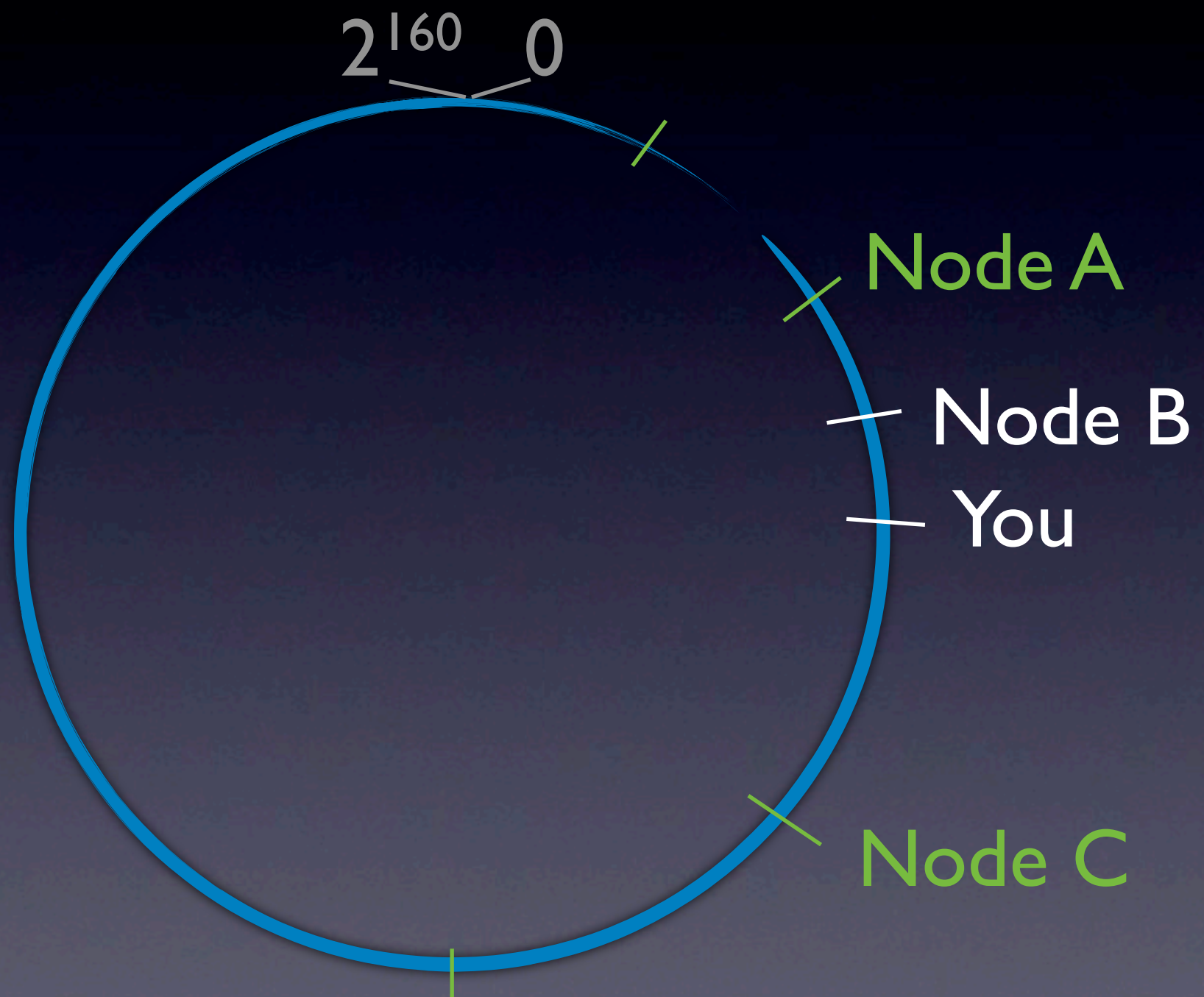
Nodes



Joining

Nodes

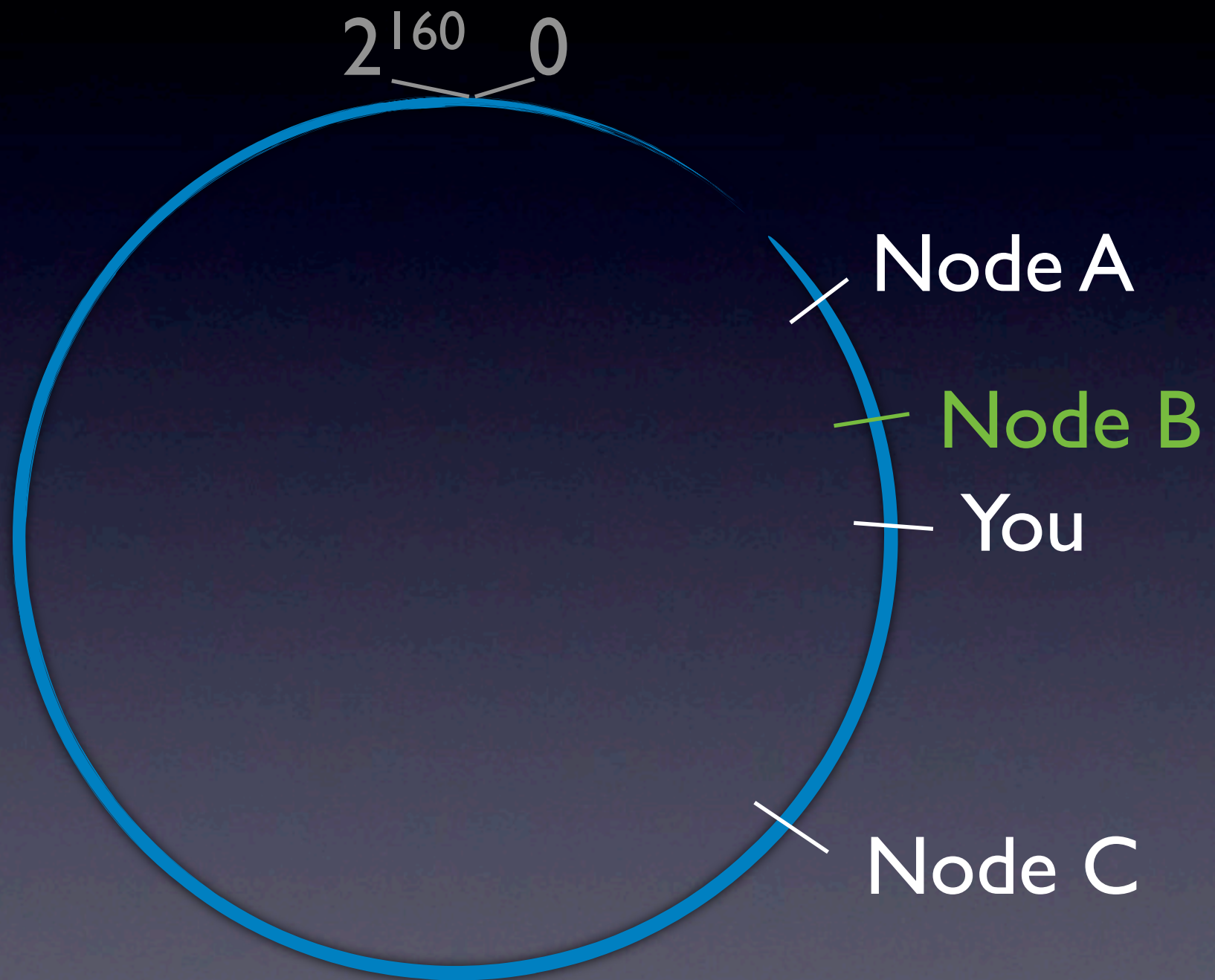
Root



Joining

Nodes

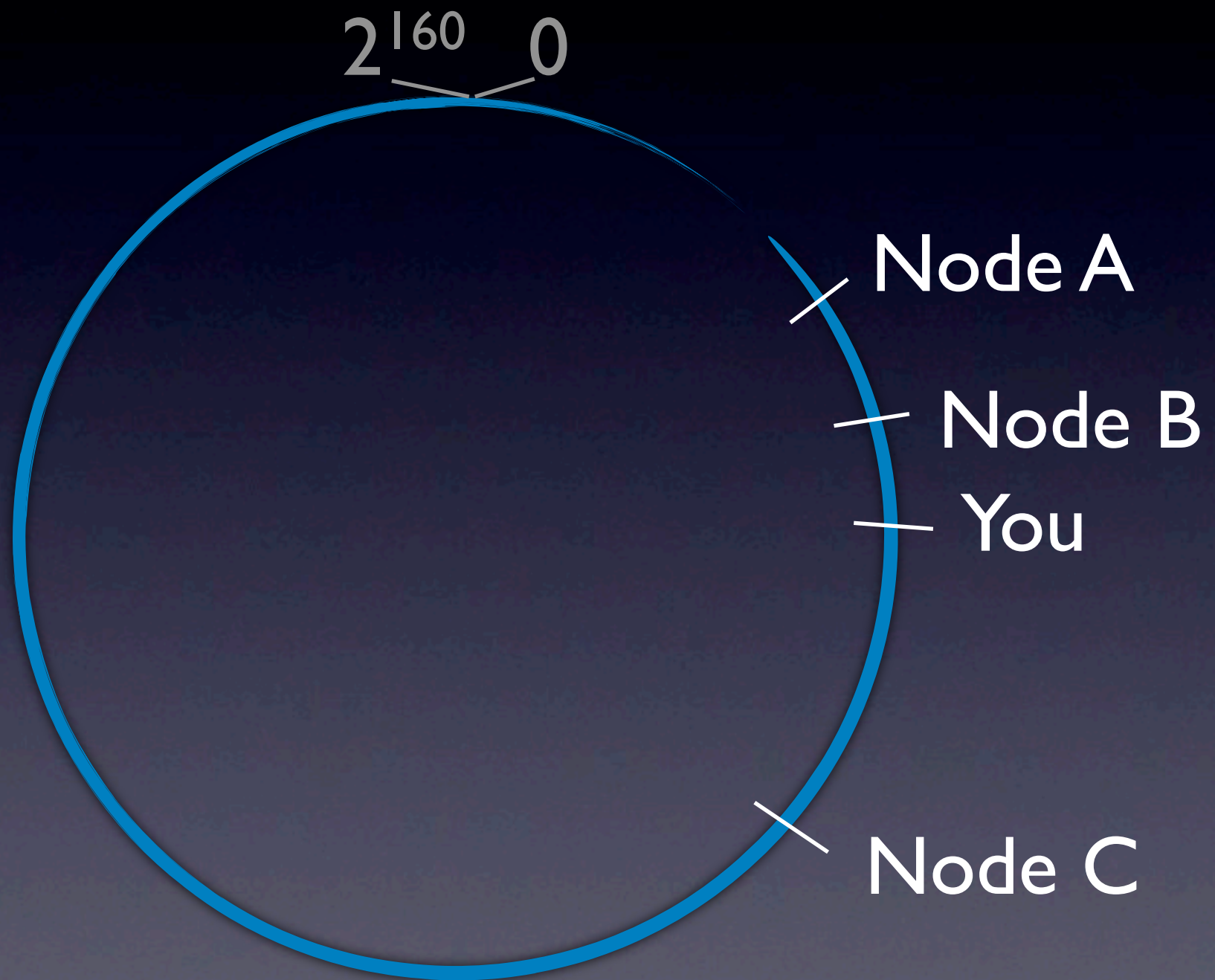
Root
...
Node C
Node A



Joining

Nodes

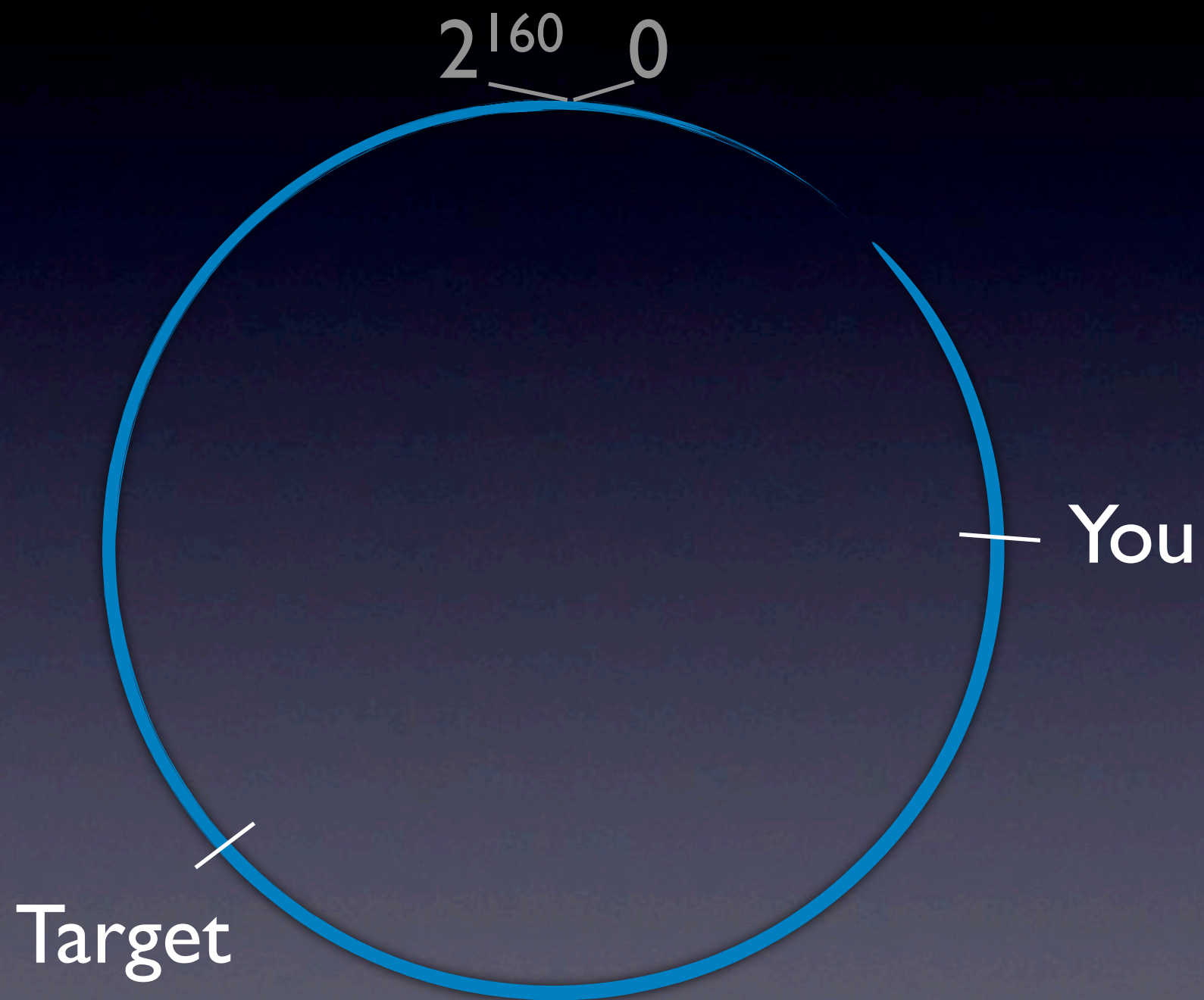
Root
...
Node C
Node A
Node B



Requests

Nodes

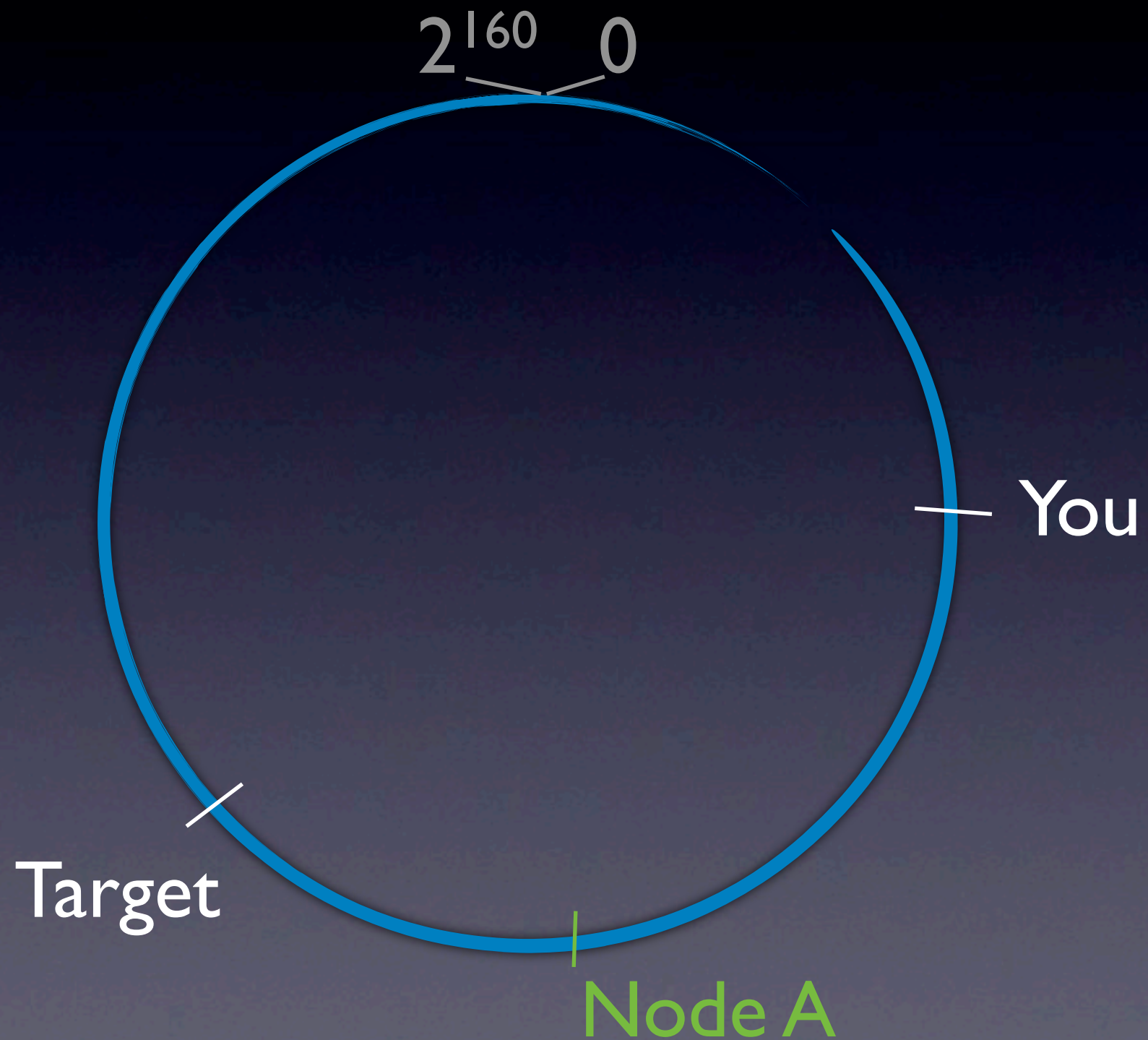
Root
...
...
...
...
...
...
...
...
...



Requests

Nodes

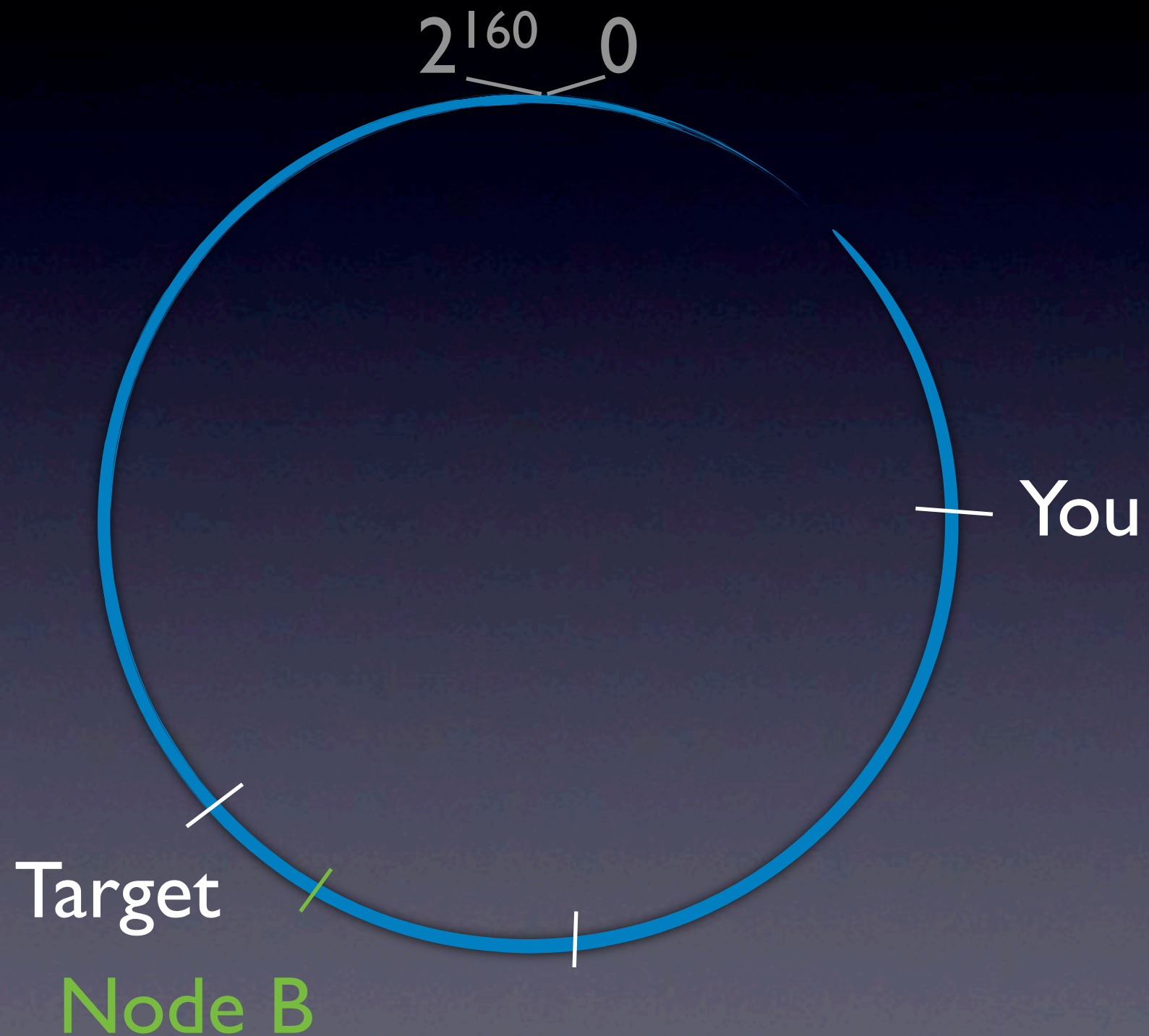
Root
Node A
...
...
...
...
...
...
...
...



Requests

Nodes

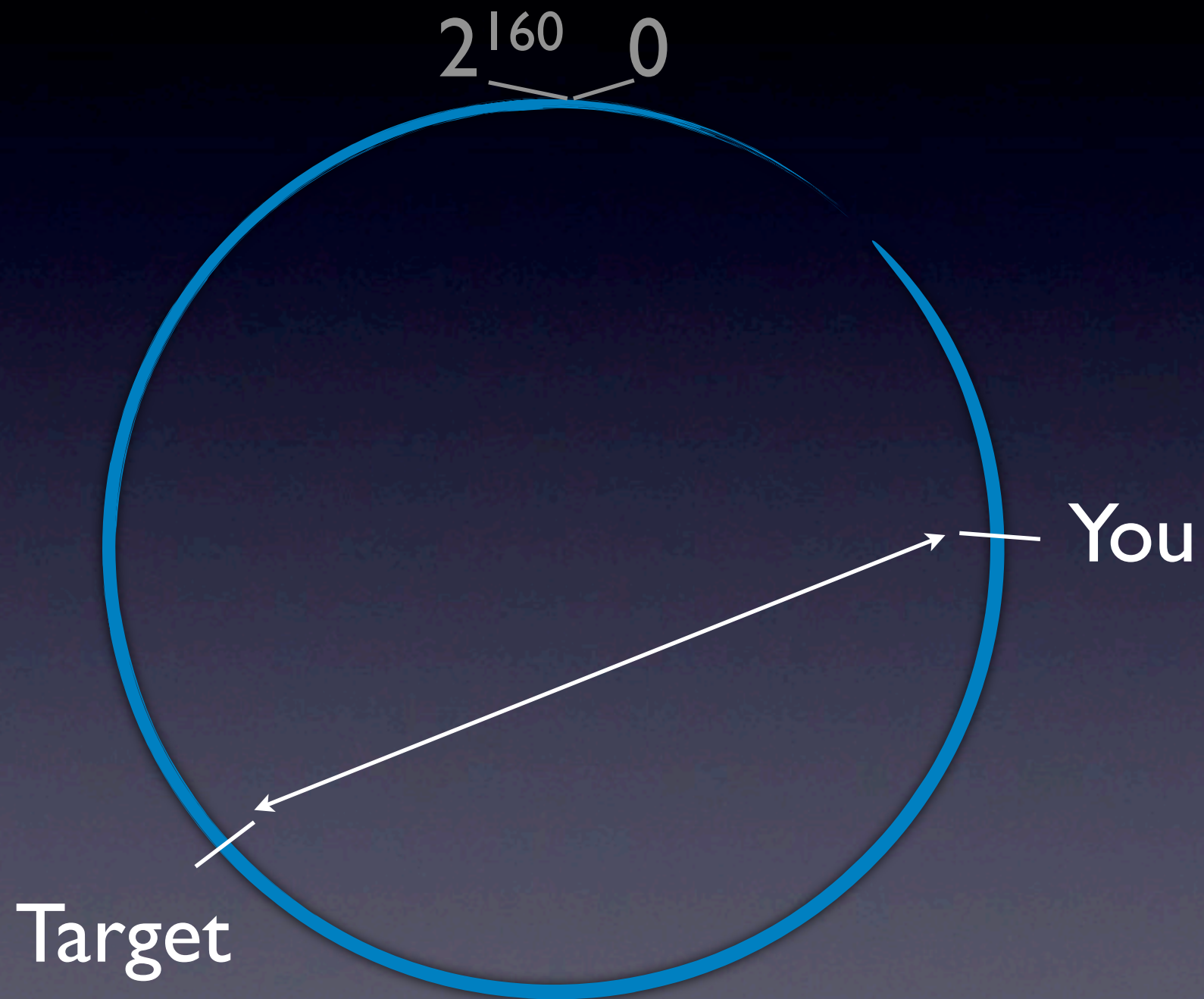
Root
Node A
...
...
...
...
...
...
...
...



Requests

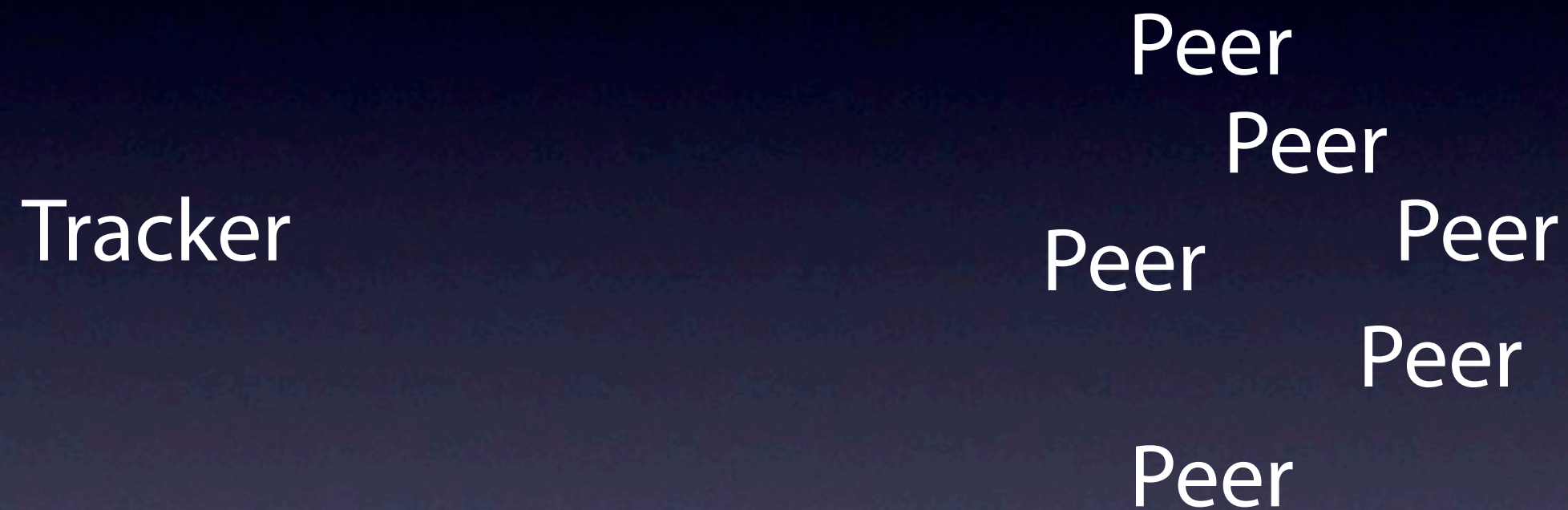
Nodes

Root
Node A
...
...
...
...
...
...
...
...



BitTorrent

BitTorrent

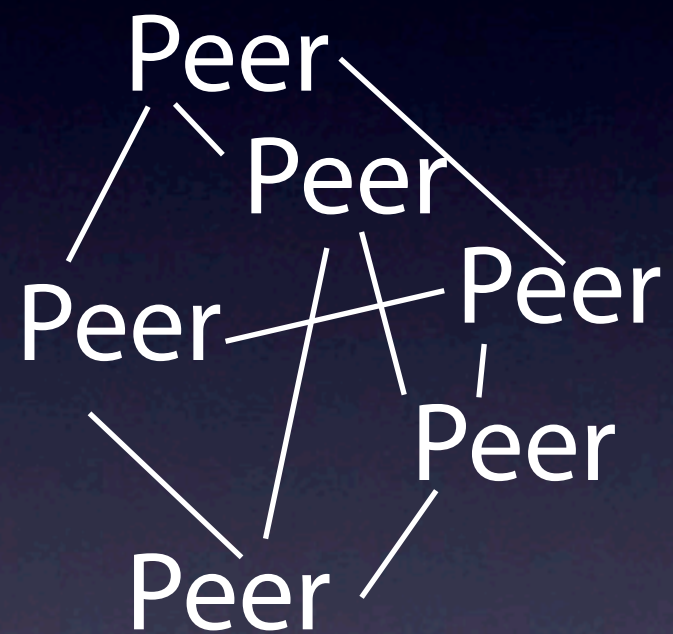


BitTorrent



BitTorrent

Tracker



BitTorrent



BitTorrent

Tracker

Total Upload

Total Download

Total Left

BitTorrent

Tracker

Total Upload

Total Download

Total Left

Peers



