Tree Configuration in Bridged IEEE1394 Bus Network

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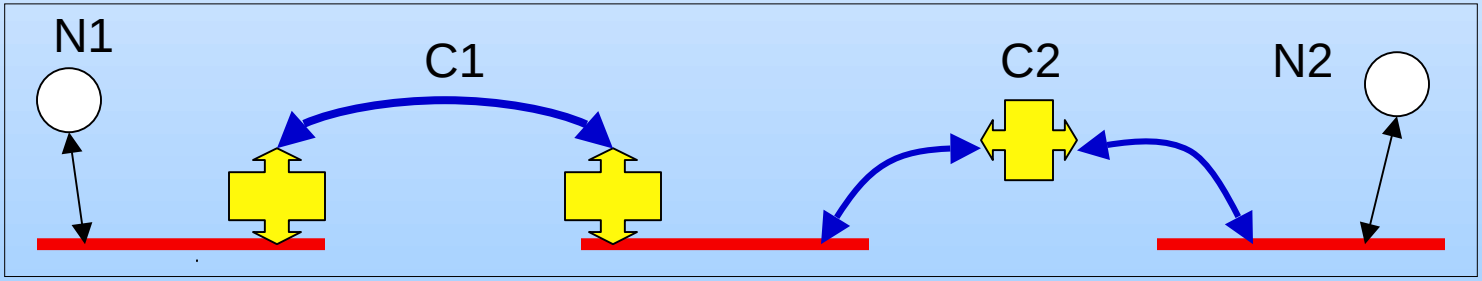
Problem Statement

- **Bridges of different capabilities**
  - ➔ Bandwidth
  - ➔ Iso Delay
- **Bridges may introduce unacceptable loops**
- **Path between any two bridges**
  - ➔ "Minimum bottleneck" route



- **Typically bridge capacity lower than bus capacity**

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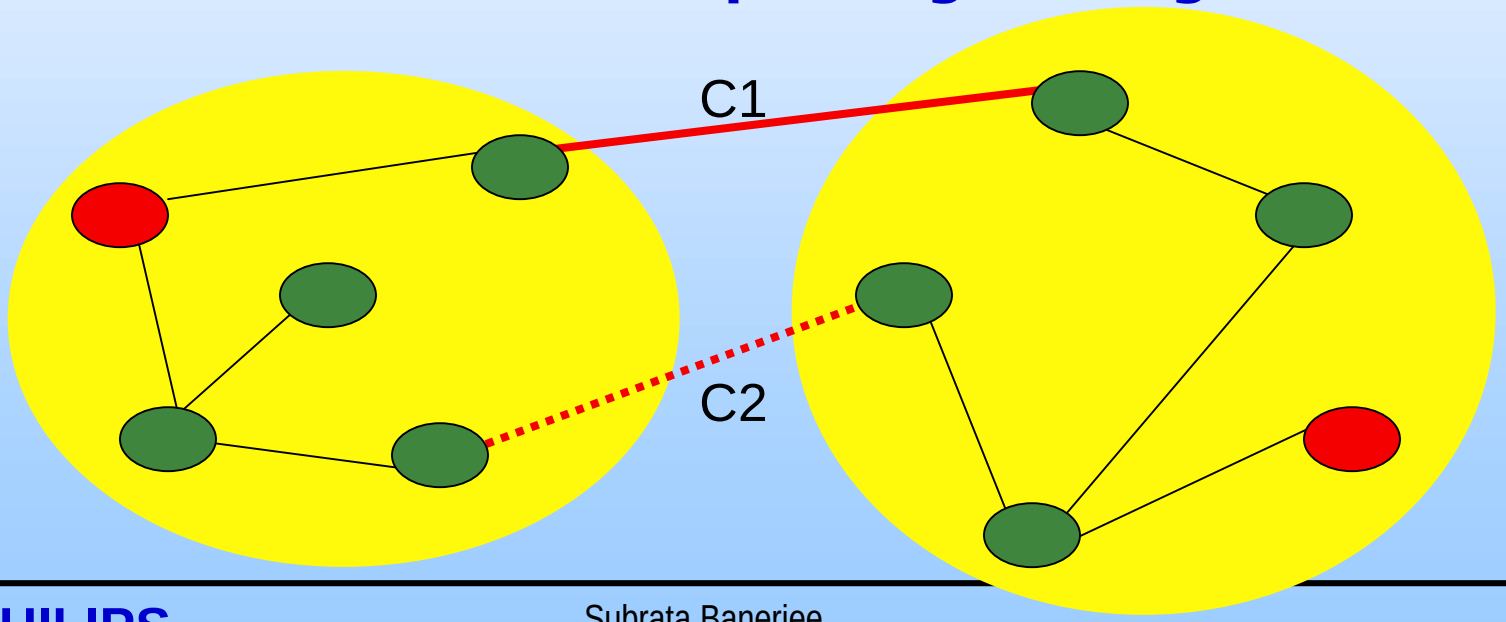
Graph Theory Result

- **Maximum Spanning Tree guarantees**
  Minimum Bottleneck Route
  Between every pair of nodes
- **Distributed maximum spanning tree algorithm**



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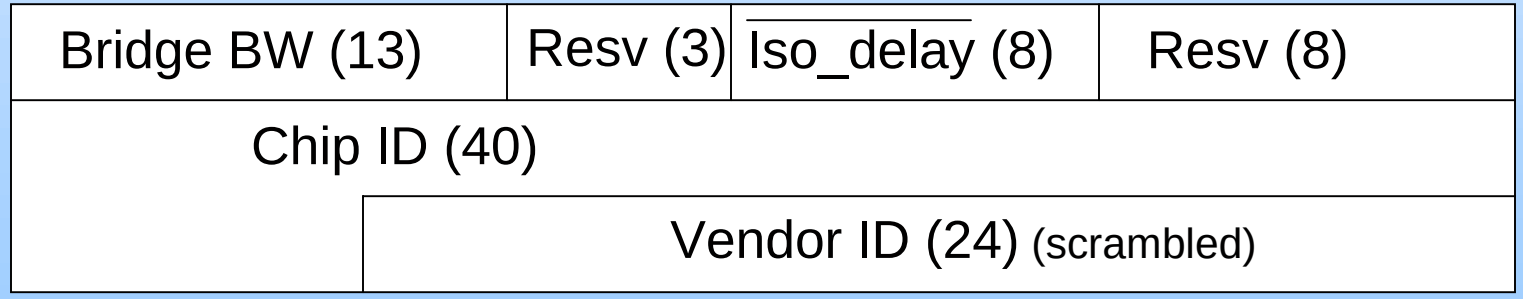
How to Choose Between Two Bridges?

- **Bridge Capability Parameters**
  - ➔ **Bridge Bandwidth**
  - ➔ **Bridge Iso_Delay**
  - ➔ **Bridge Vendor ID** = max. of 2 portal vendor IDs
  - ➔ **Bridge Node ID** = max. of 2 portal vendor IDs
- **Proposed Organization**



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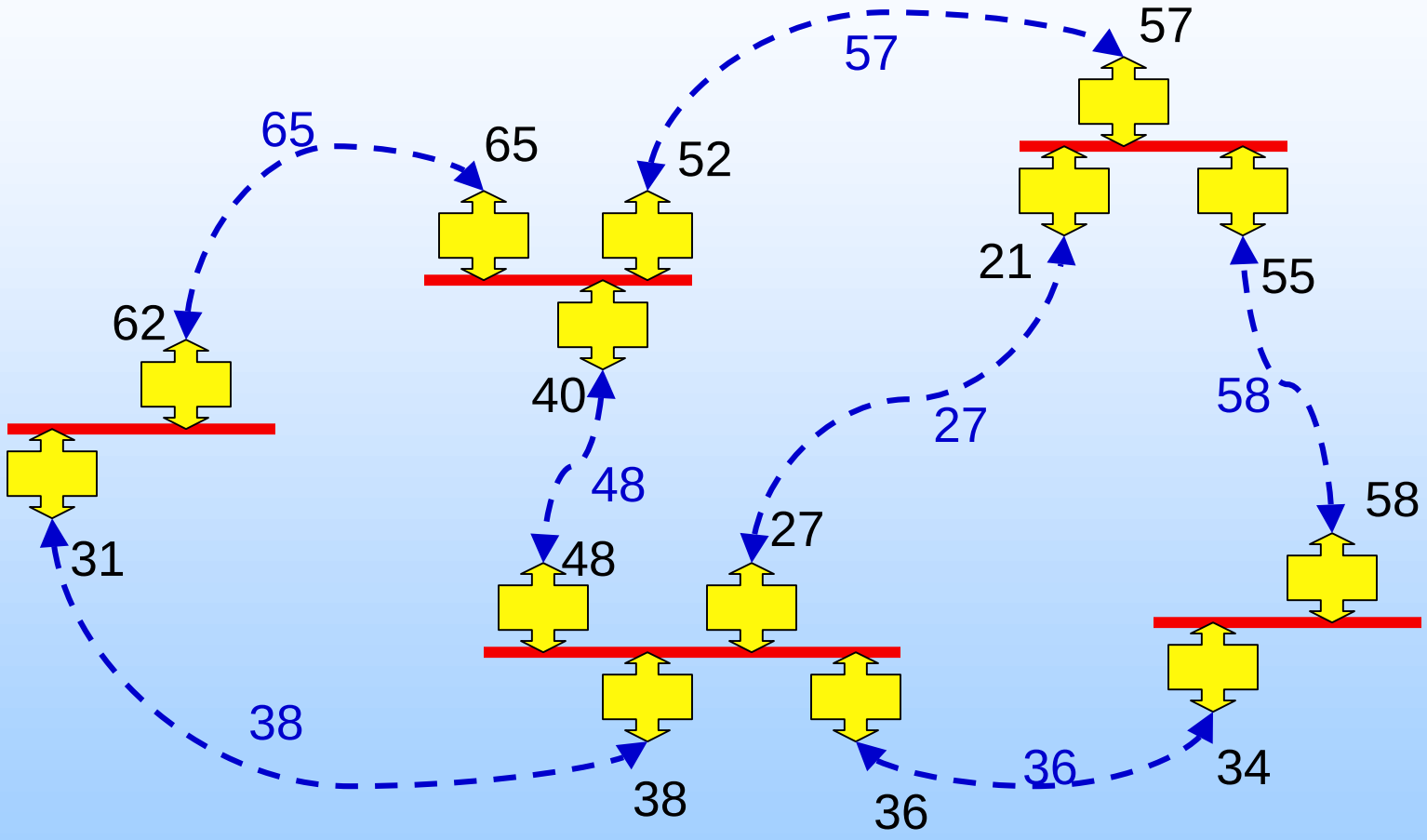
An Example of Tree Conf. Algorithm (1)



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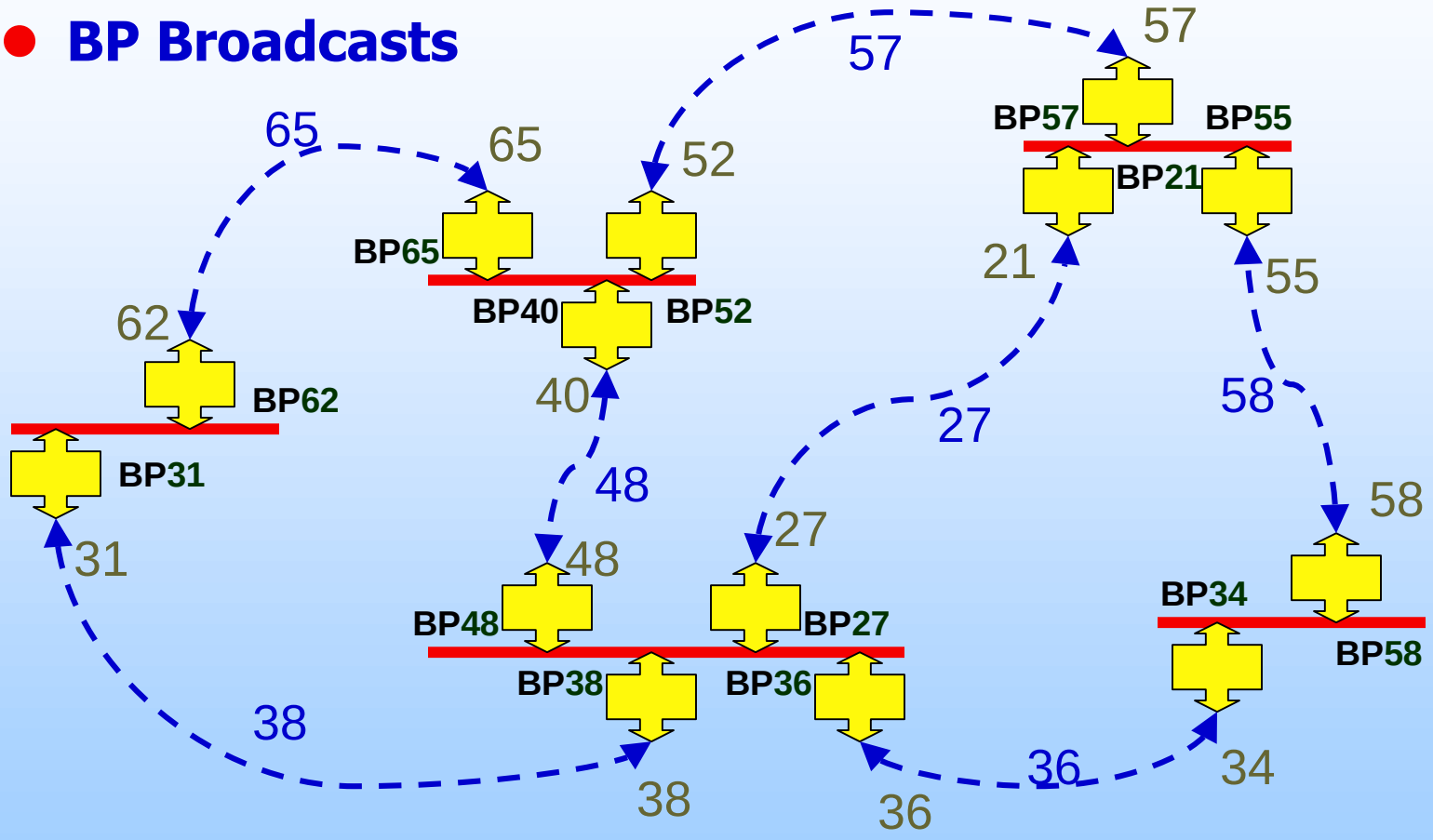
An Example of Tree Conf. Algorithm (2)

- **BP Broadcasts**



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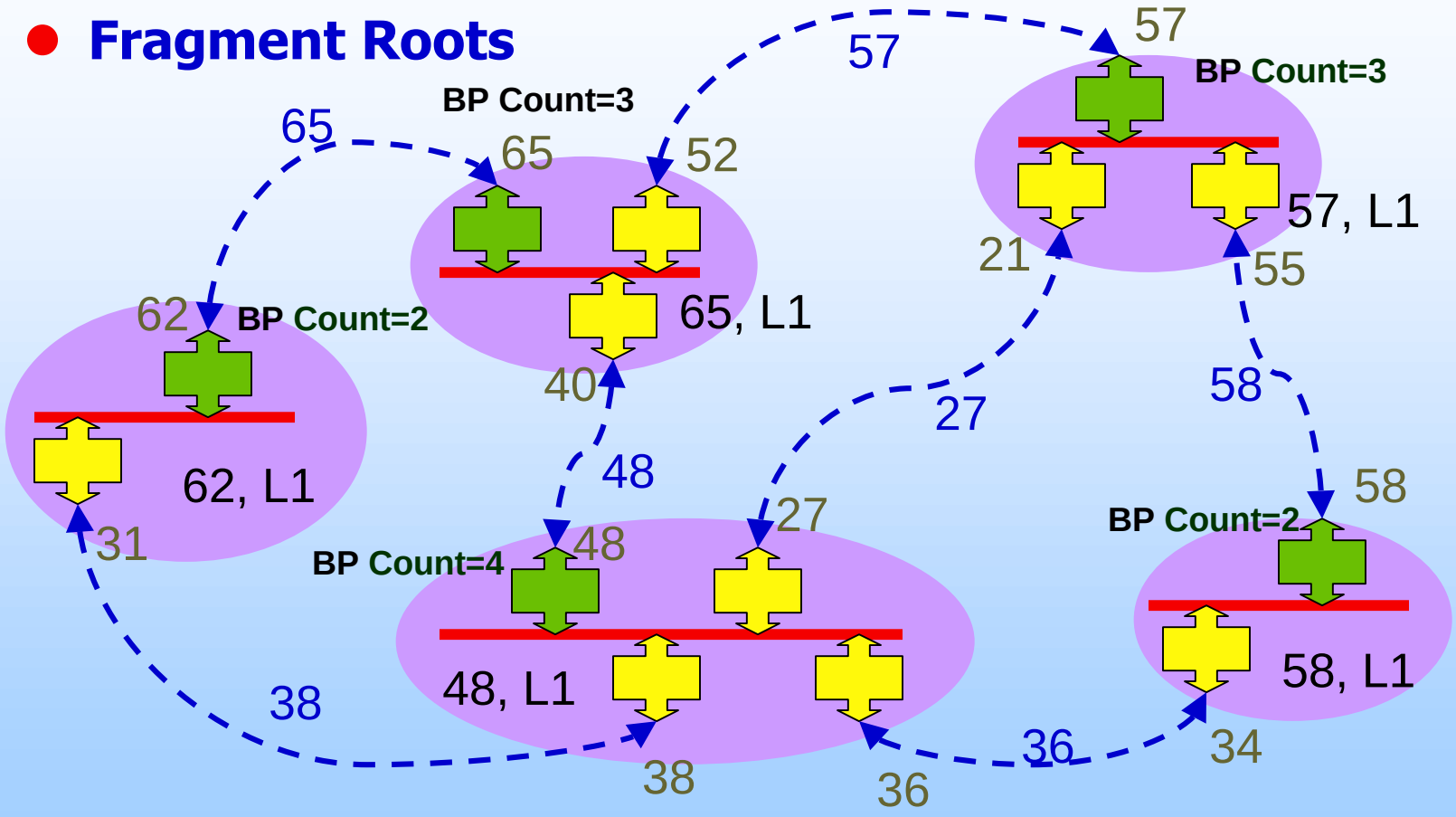
An Example of Tree Conf. Algorithm (3)

- **Fragment Roots**



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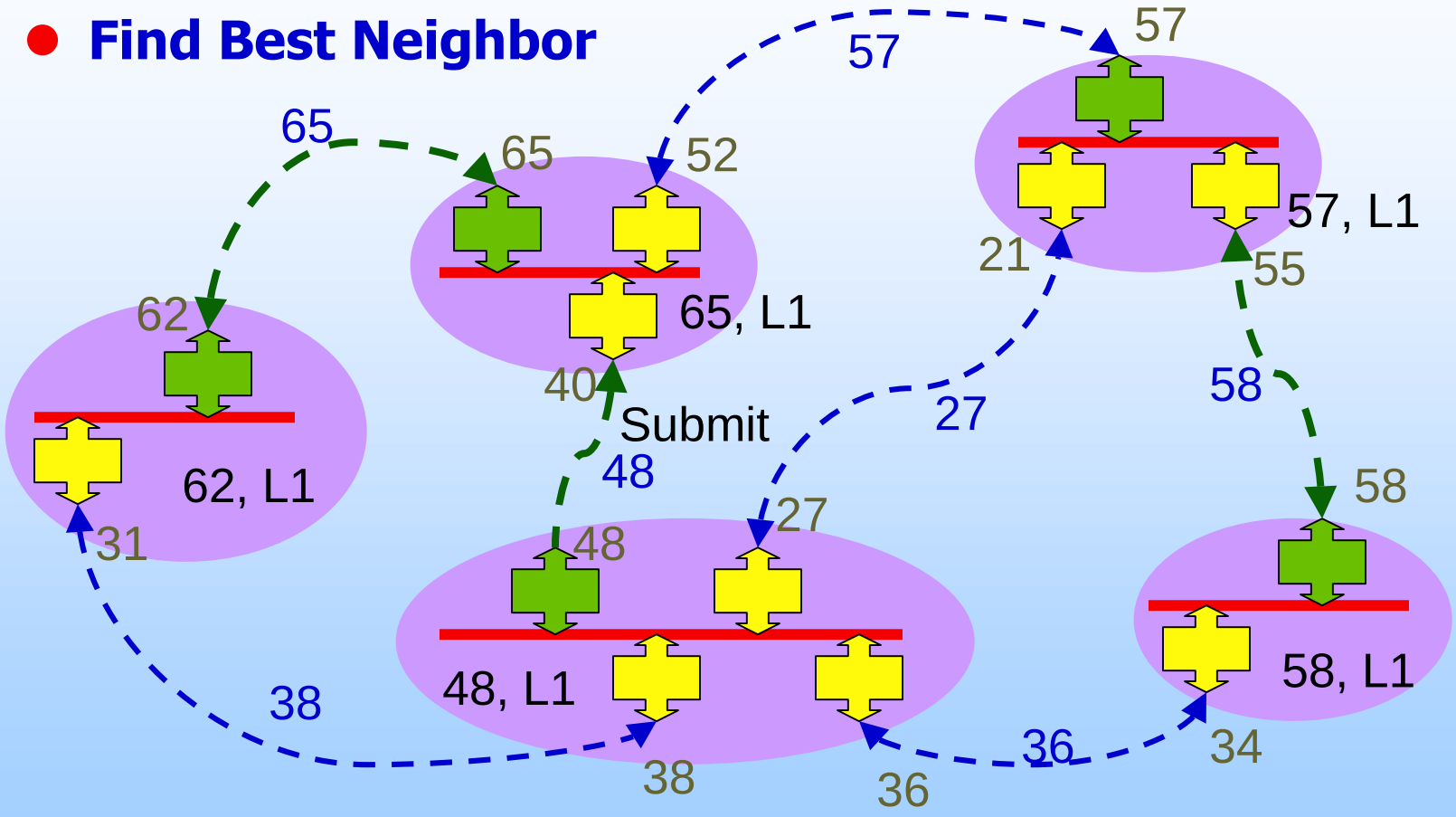
An Example of Tree Conf. Algorithm (4)

- **Find Best Neighbor**



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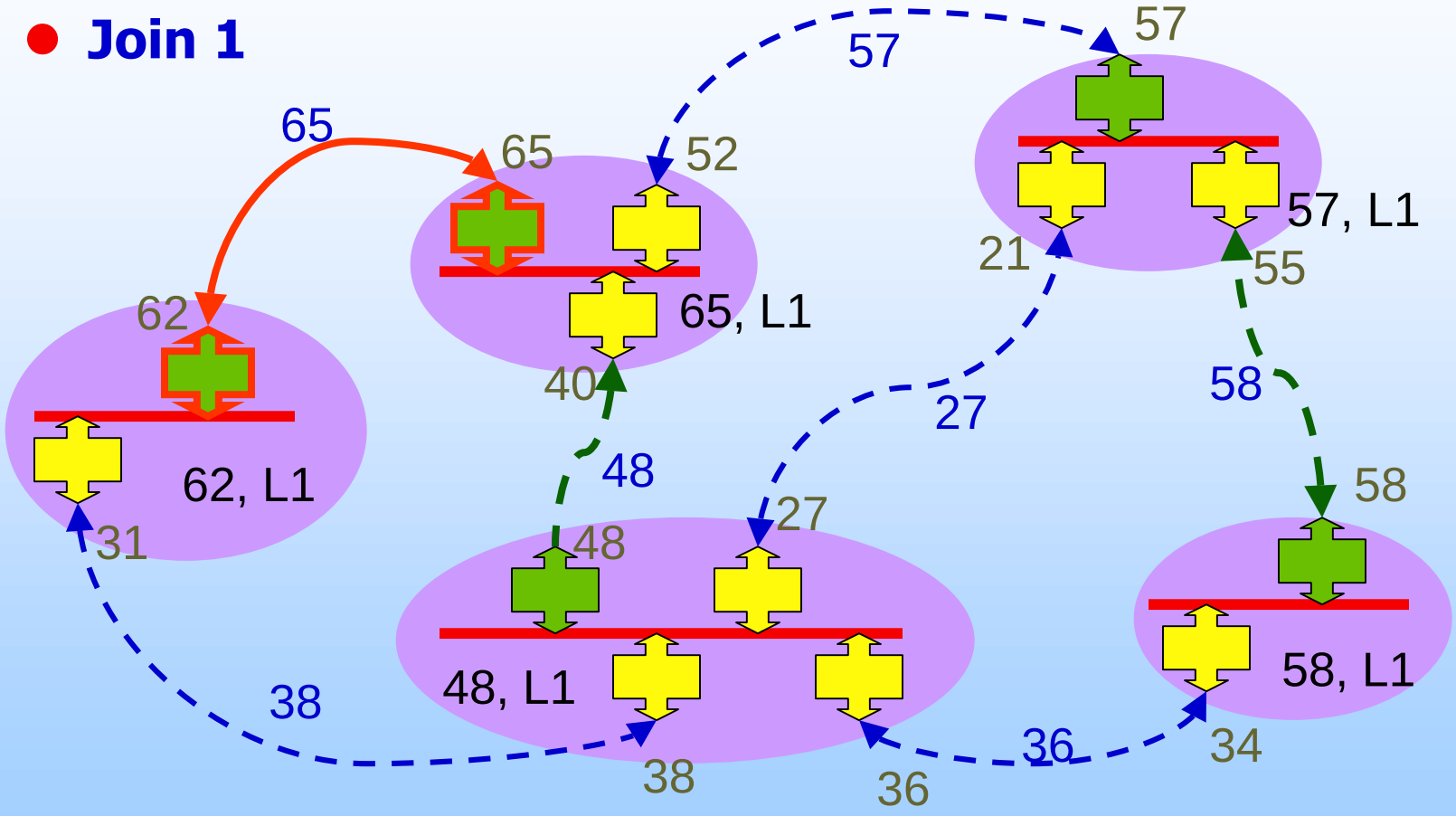
An Example of Tree Conf. Algorithm (5)

- **Join 1**



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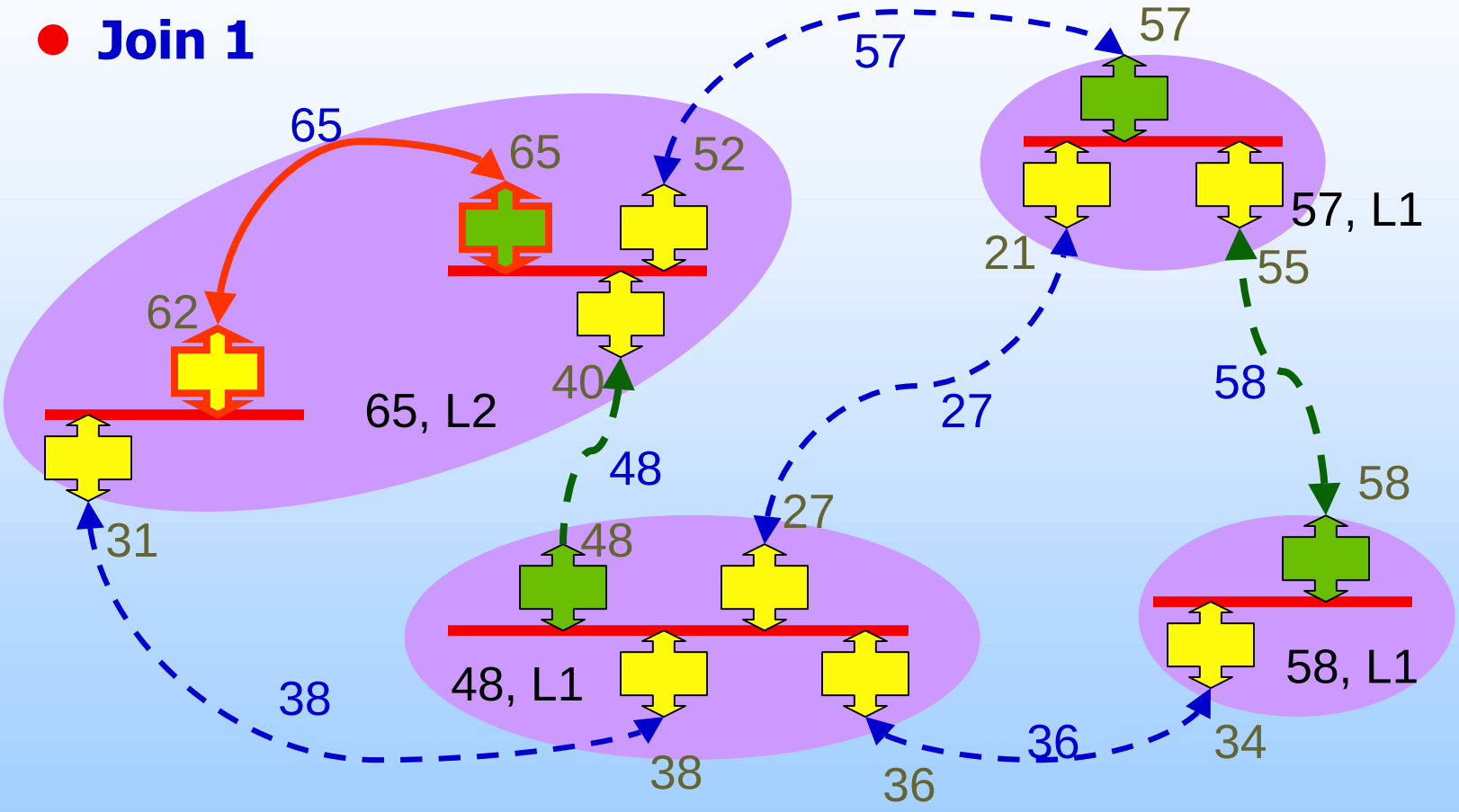
An Example of Tree Conf. Algorithm (6)

- **Join 1**



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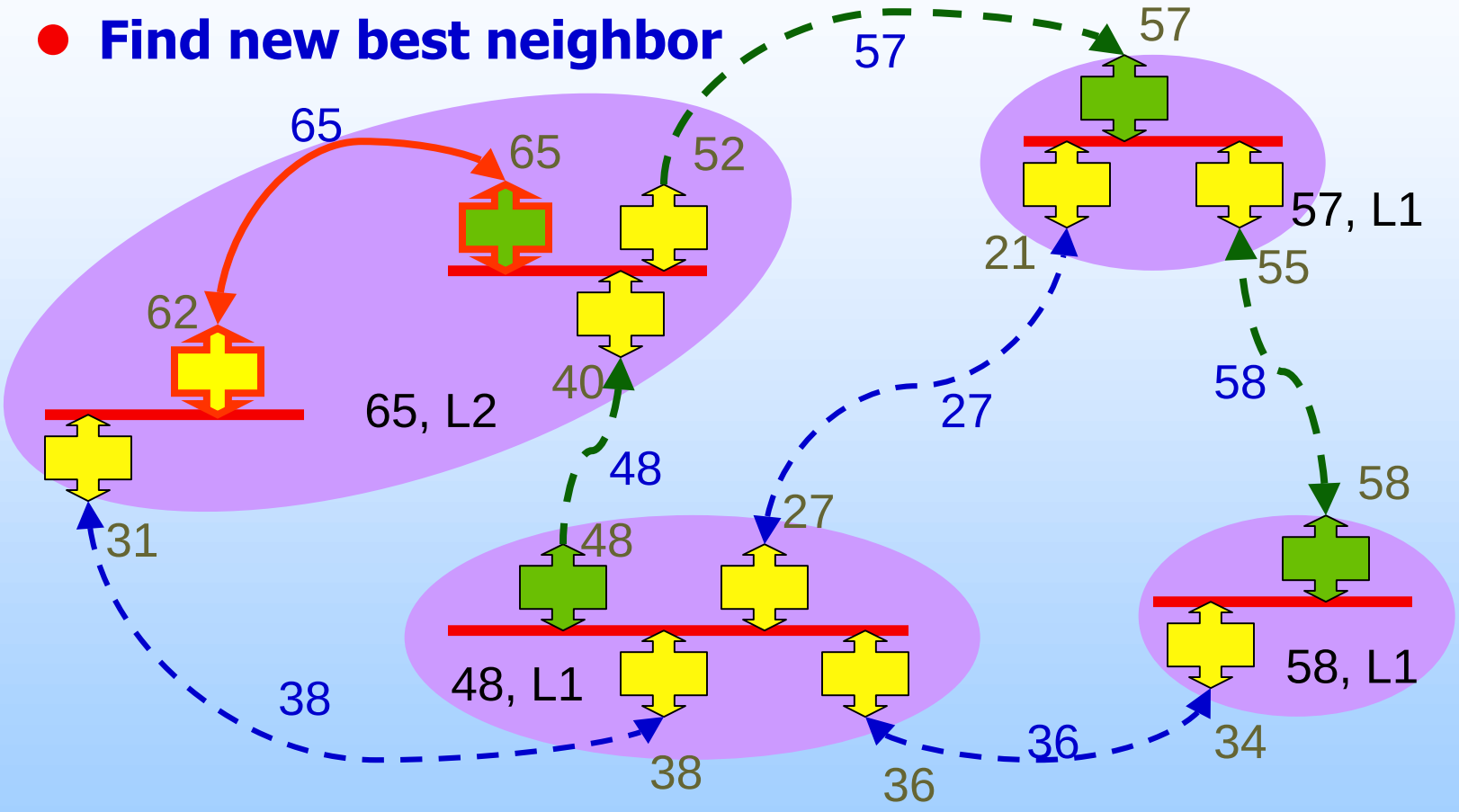
An Example of Tree Conf. Algorithm (7)

- **Find new best neighbor**



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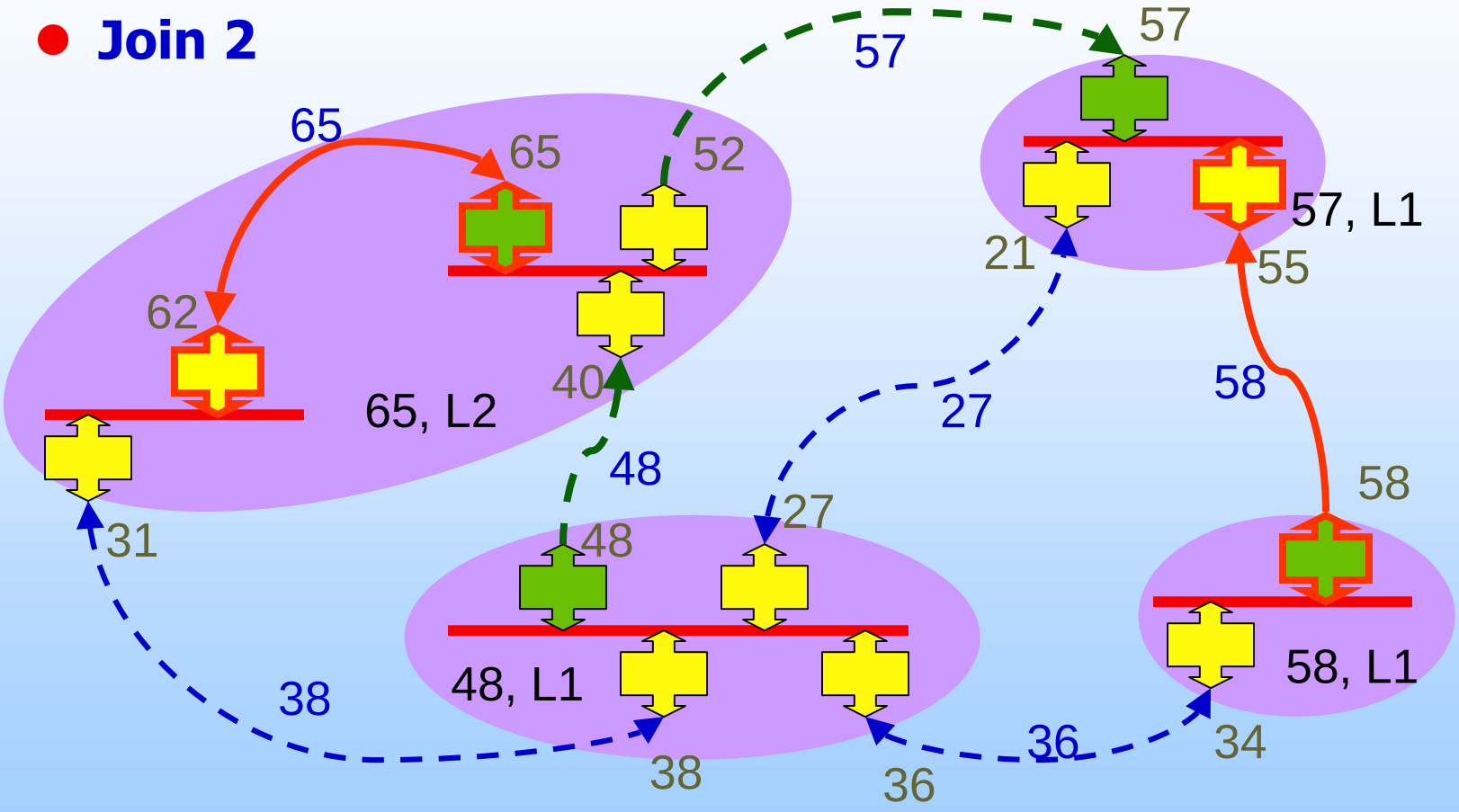
An Example of Tree Conf. Algorithm (8)

- **Join 2**



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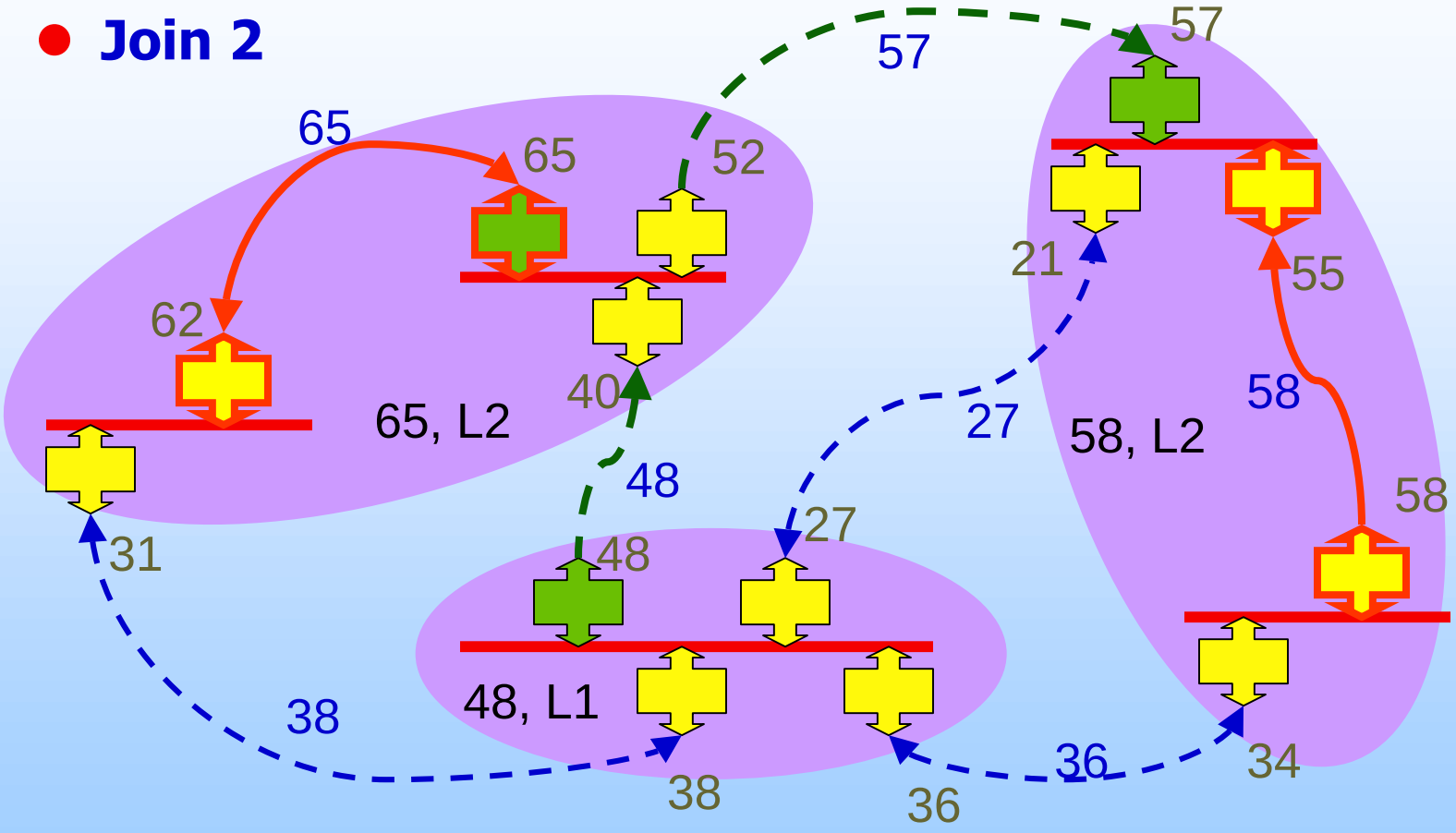
An Example of Tree Conf. Algorithm (9)

- **Join 2**



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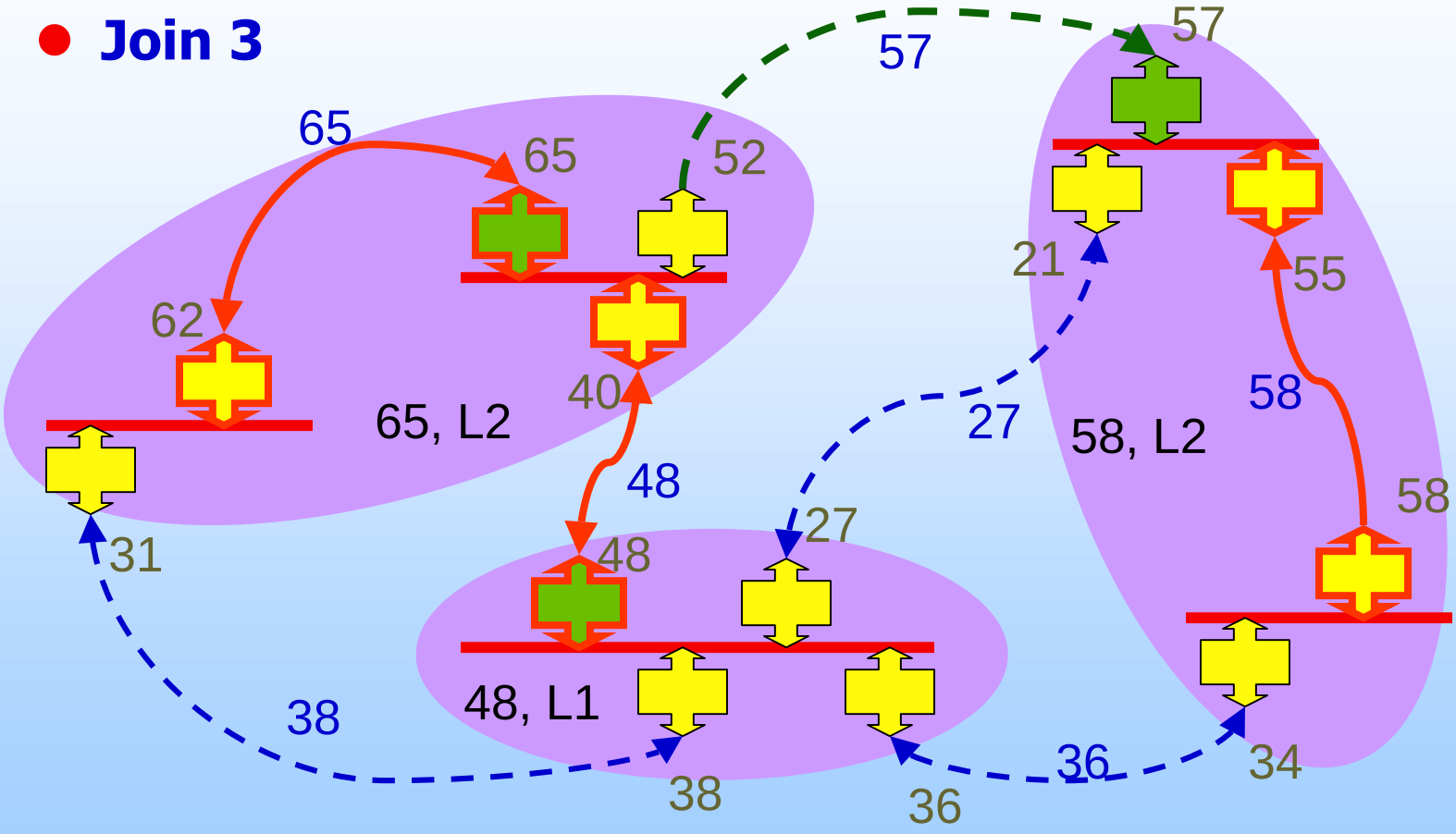
An Example of Tree Conf. Algorithm (10)

- **Join 3**



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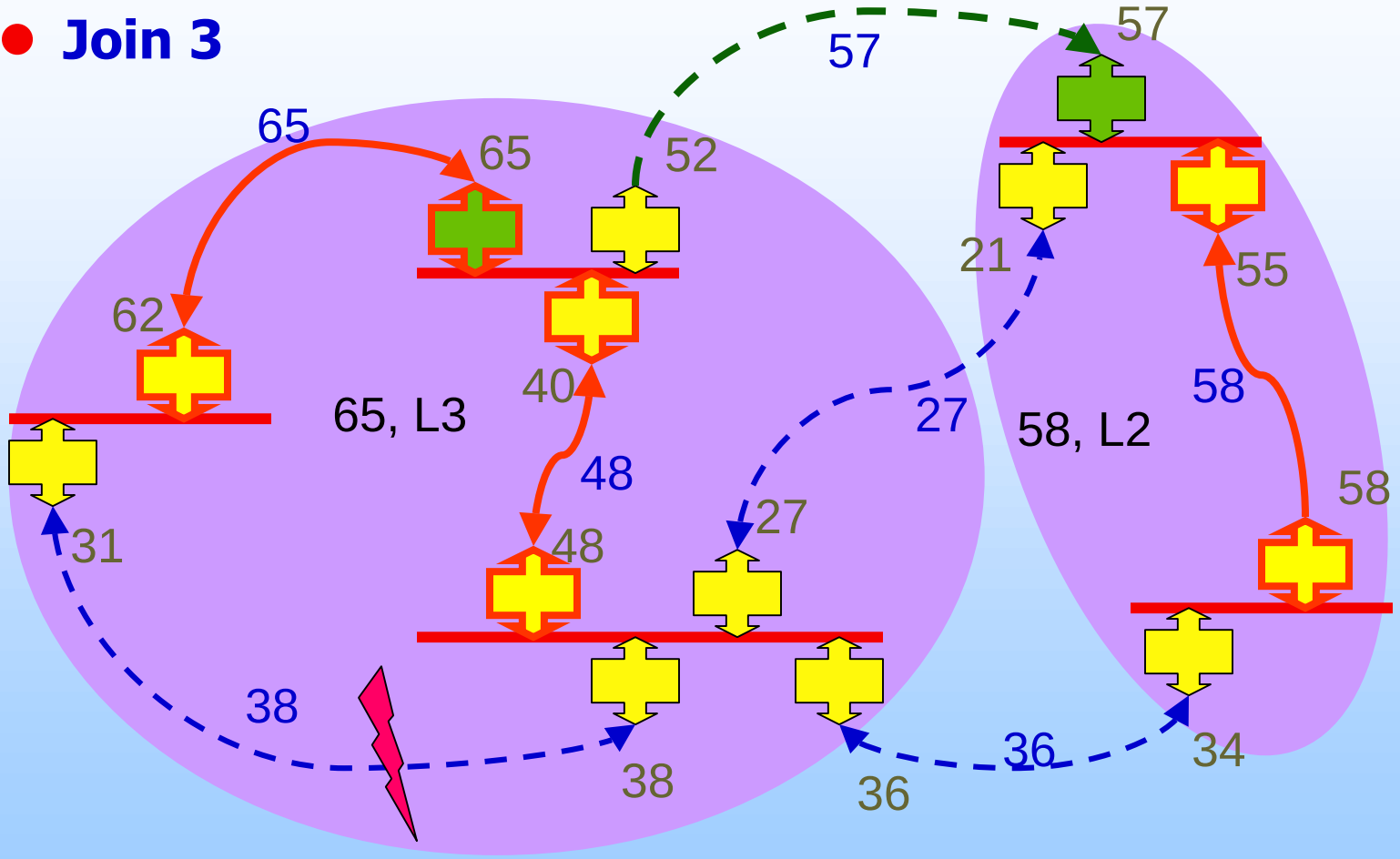
An Example of Tree Conf. Algorithm (11)

- **Join 3**



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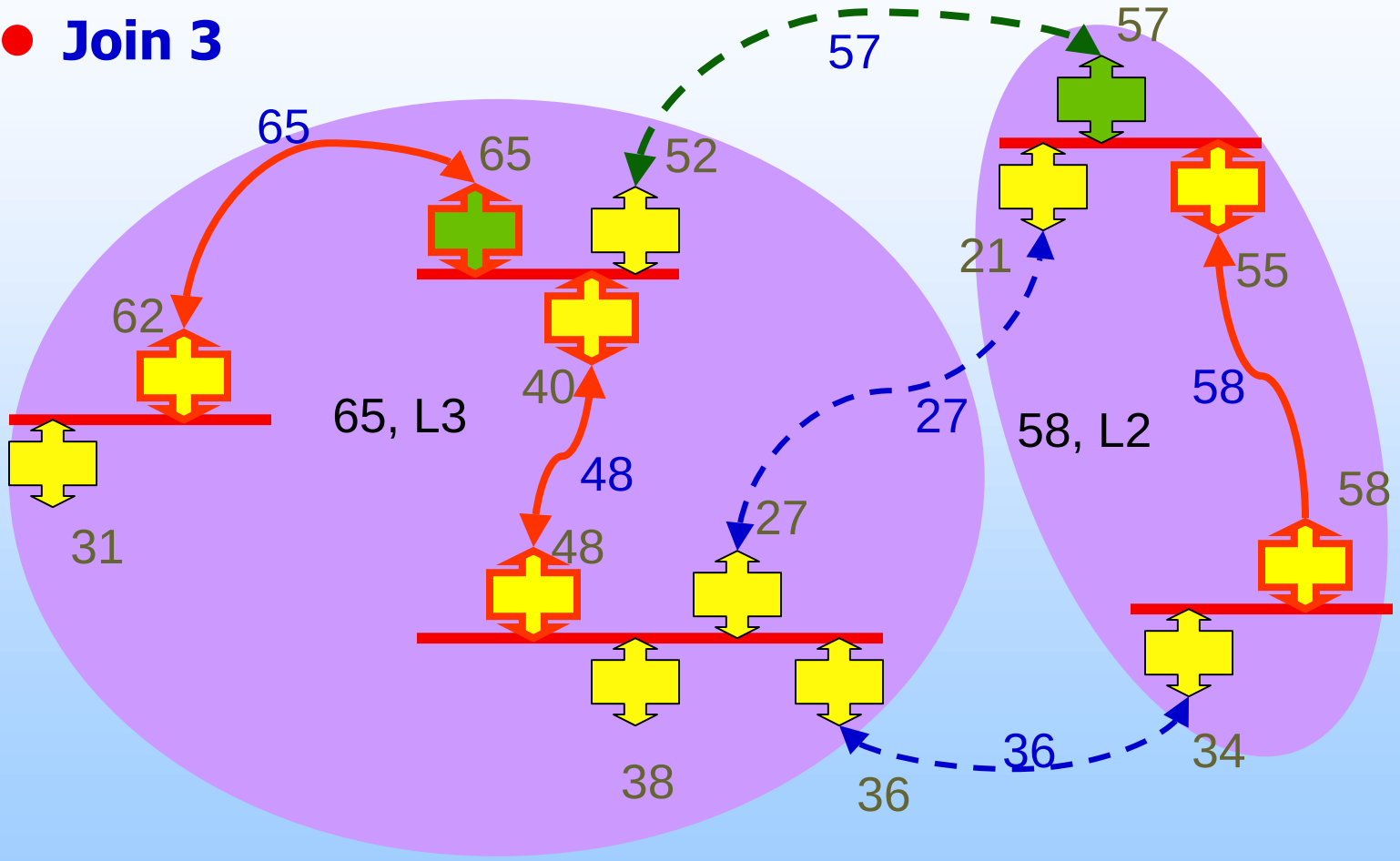
An Example of Tree Conf. Algorithm (12)

- **Join 3**



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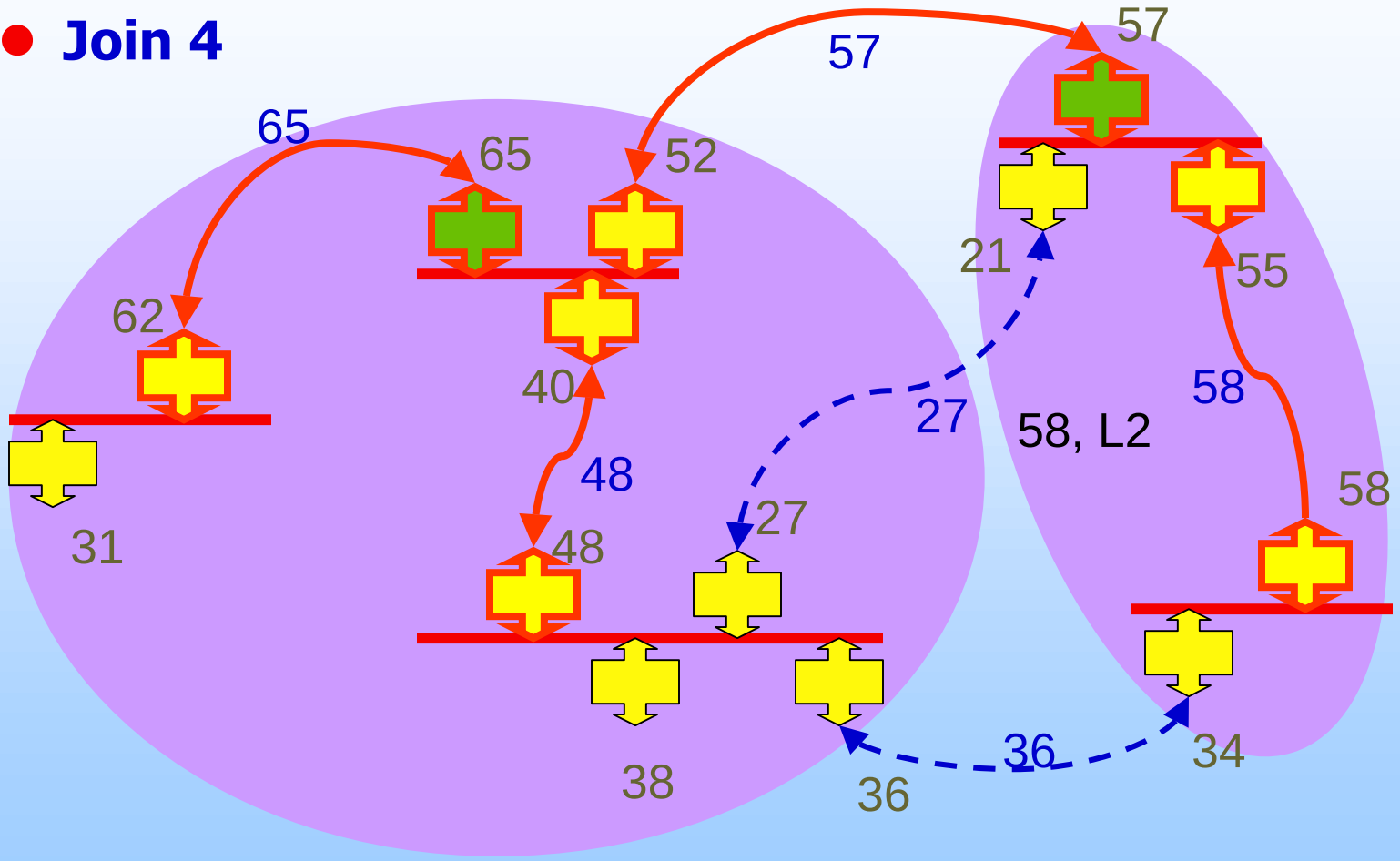
An Example of Tree Conf. Algorithm (13)

- **Join 4**



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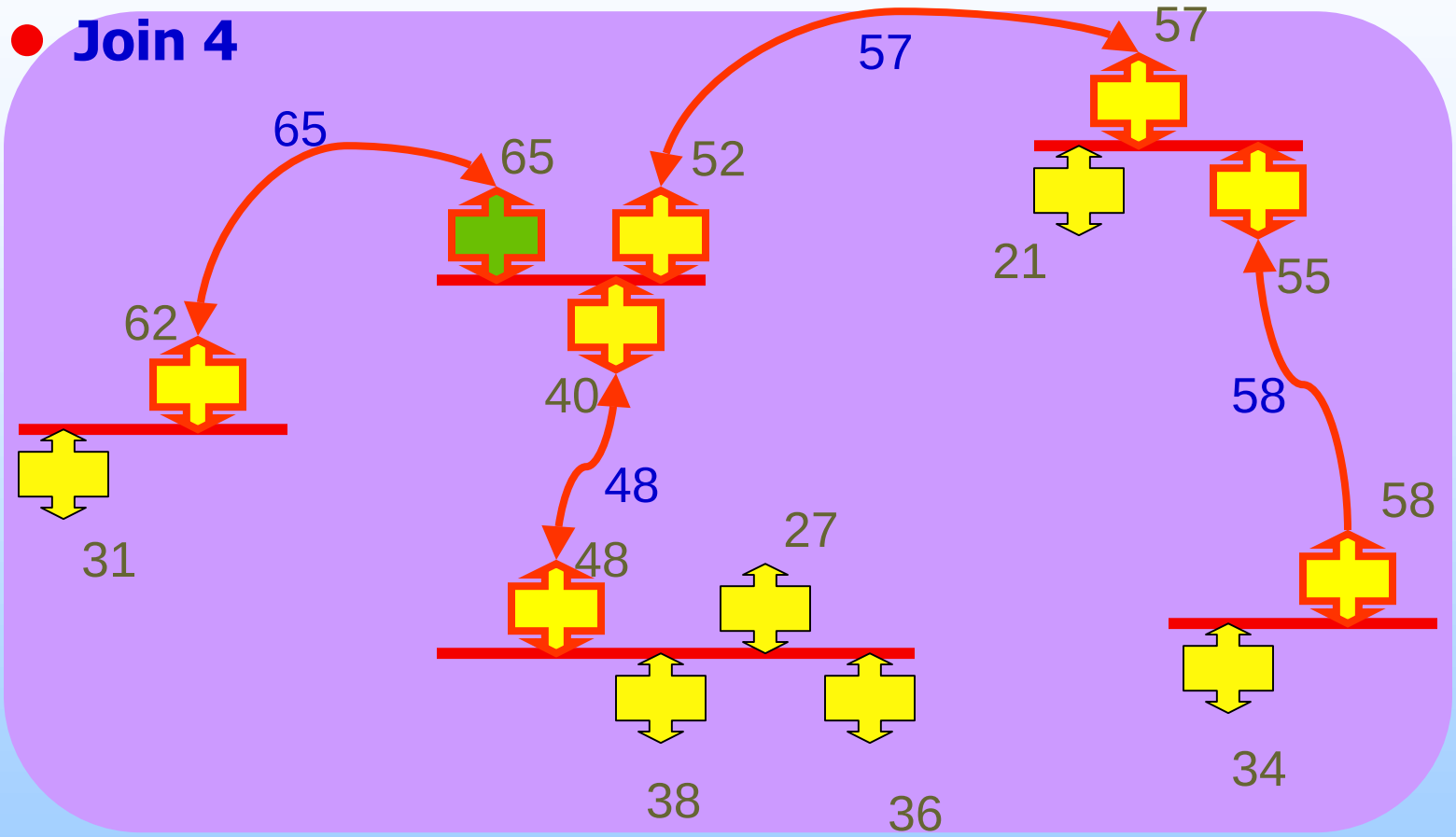
An Example of Tree Conf. Algorithm (14)

- **Join 4**



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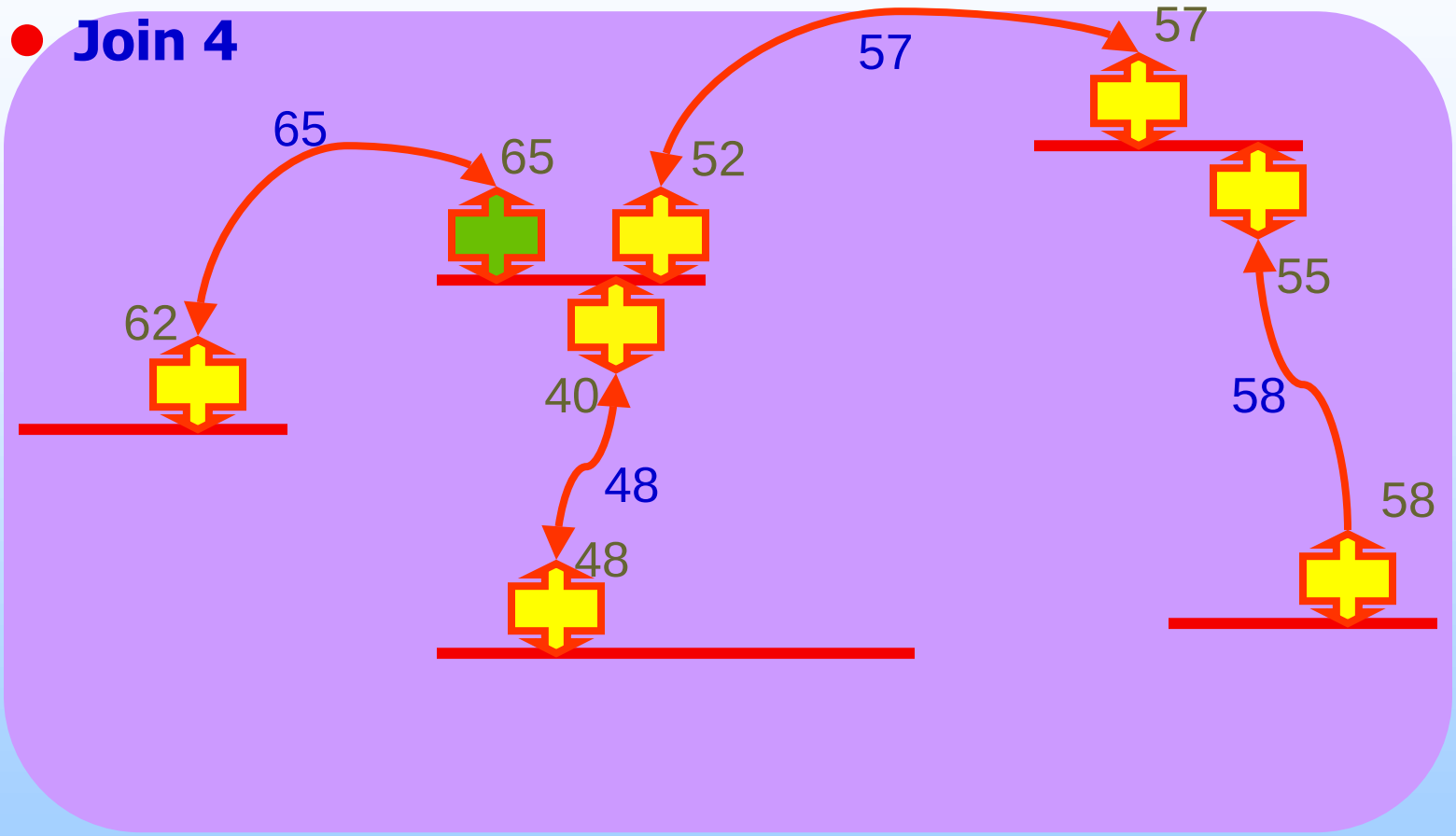
An Example of Tree Conf. Algorithm (15)

- **Join 4**



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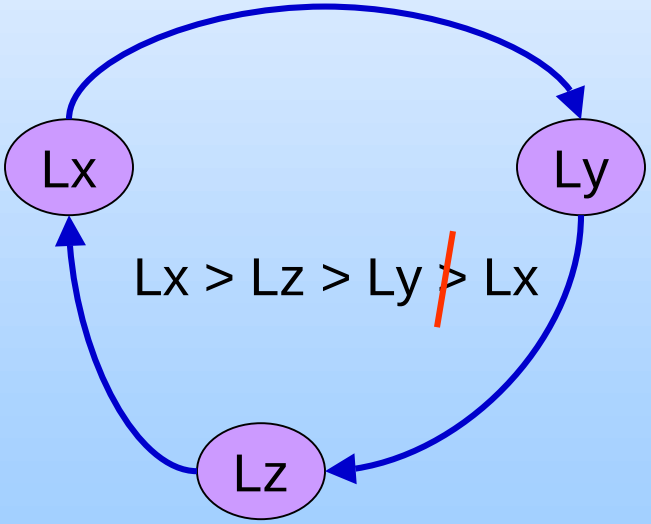
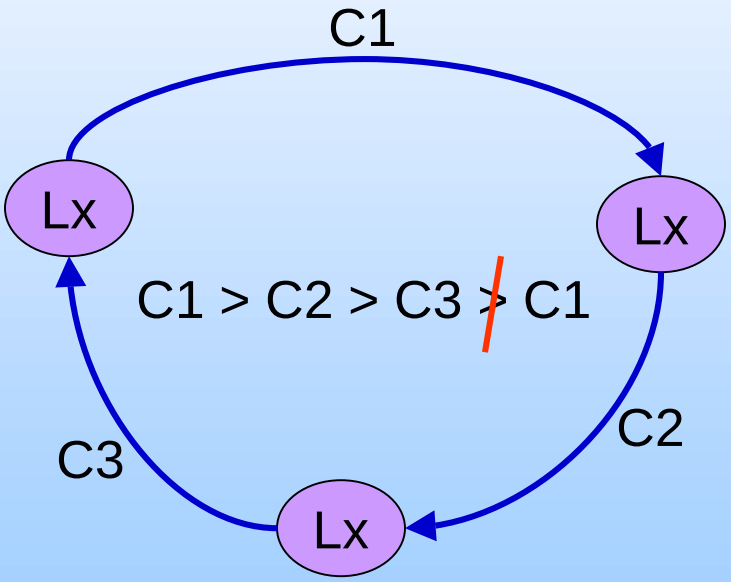
Rules of the Game

- **Fragment A can submit to Fragment B iff $Level_A \leq Level_B$**
- **Bridge Capability values are unique.**
- **No loops possible**





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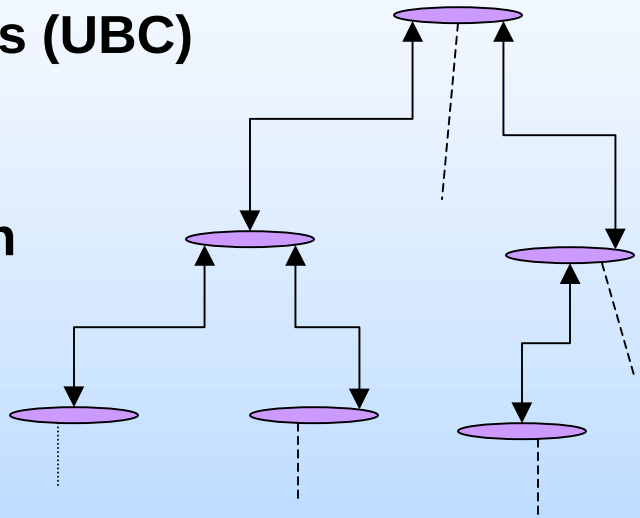
Example of Selected Commands

- "I am a BP"
  - ➔ data = Unique Bridge Capabilities (UBC)
- "Report UBC"
  - ➔ data = best UBC from all children
- "Connect"
  - ➔ data = Fragment Level
- "Update"
  - ➔ data = Fragment UID, Fragment Level



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Once the Tree Topology is Identified ...

- **Assign**
  - ➔ Bus Ids
  - ➔ Routing Bounds
  - ➔ Portal_Control.rte fields
- **Select Net Cycle Timer**
- **Assign Portal_Control.clk fields**
- **Details?**

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