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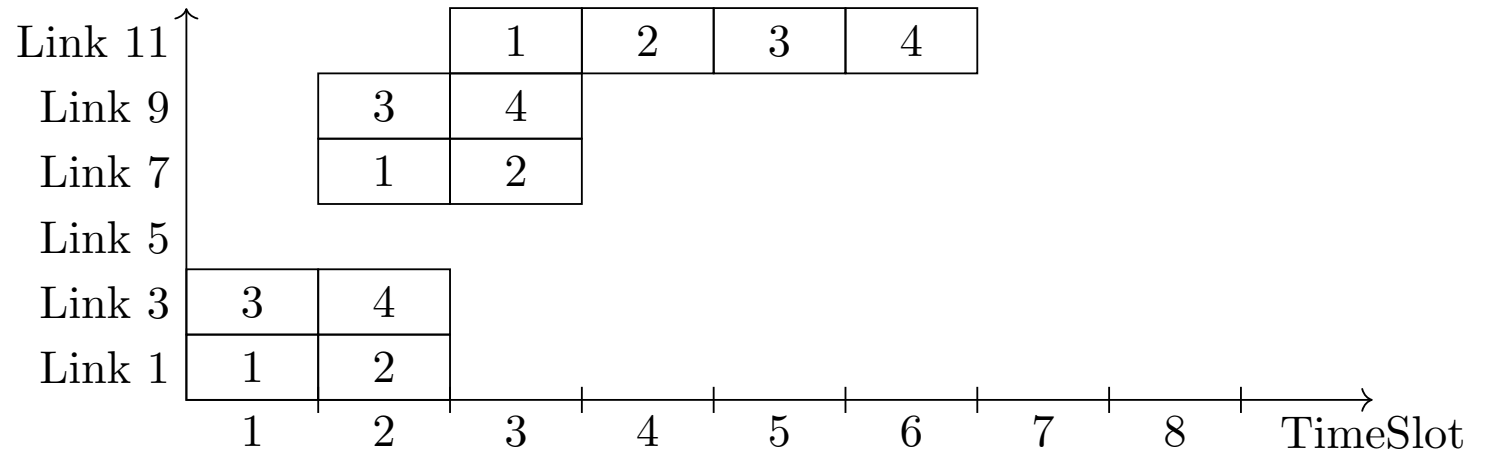
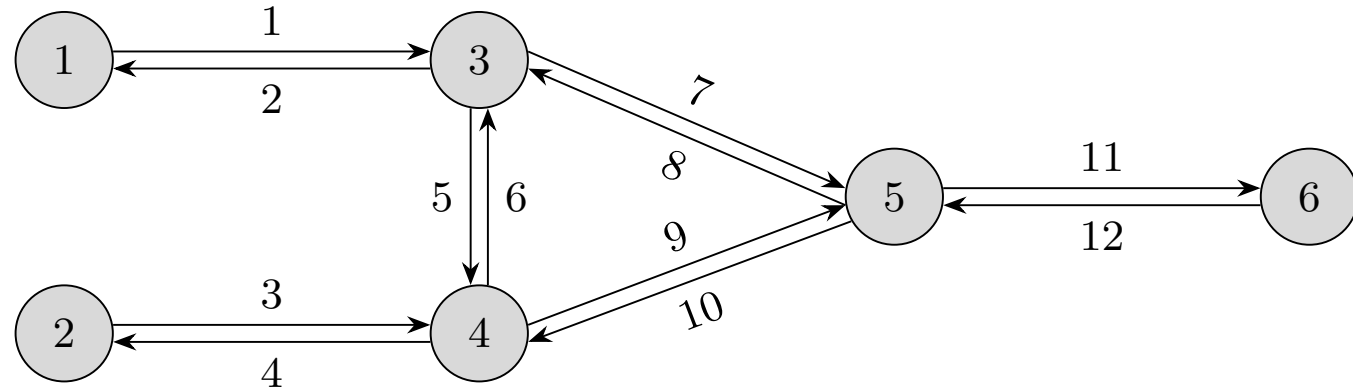
Hot-Patching Protocol: Repairing Link Failures in Time-Triggered Networks

Francisco Pozo

SICS Meeting, 31/01/2018

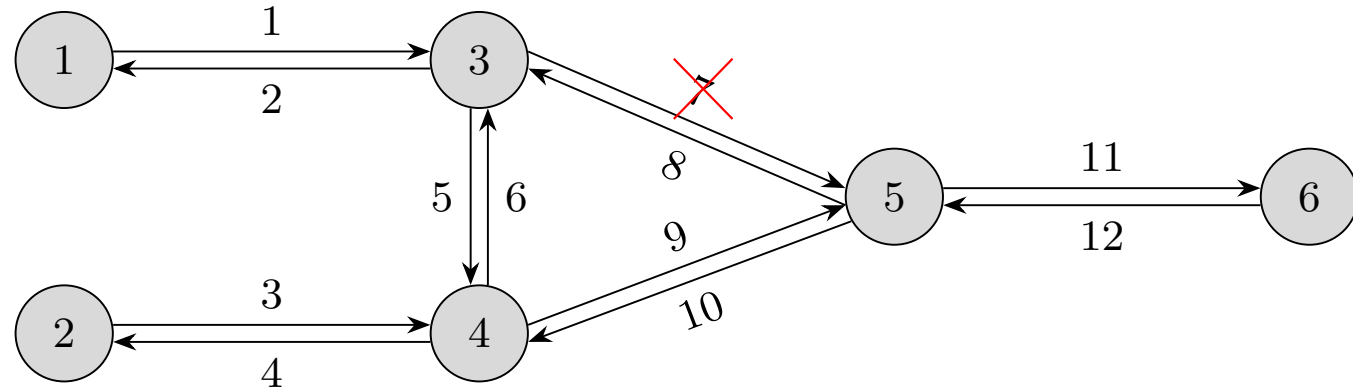
Time-Triggered Communications

- Network
 - Nodes
 - Links
 - Frames
- Schedule
- Vulnerable to changes
 - Link Failure

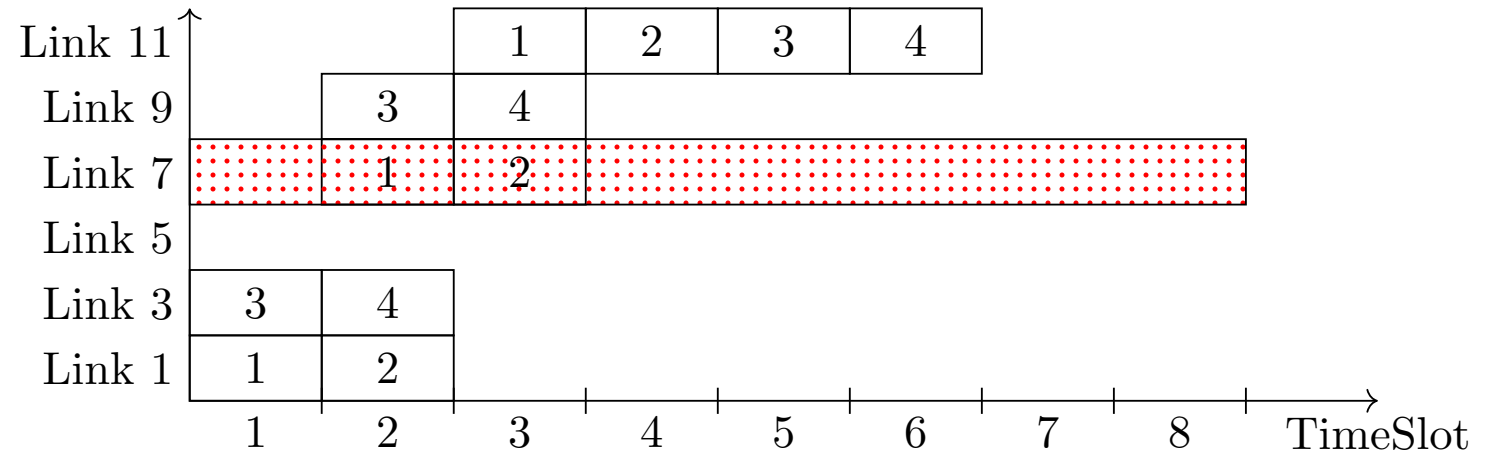


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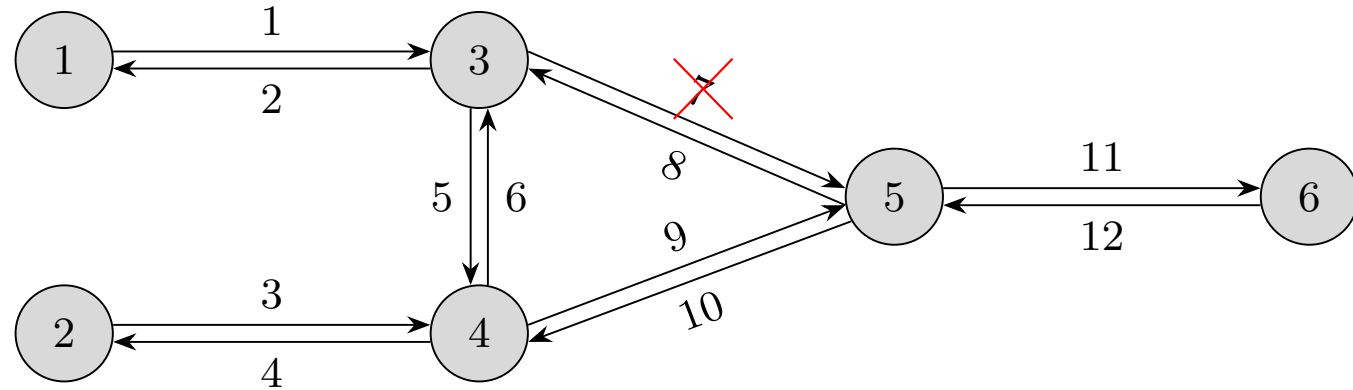


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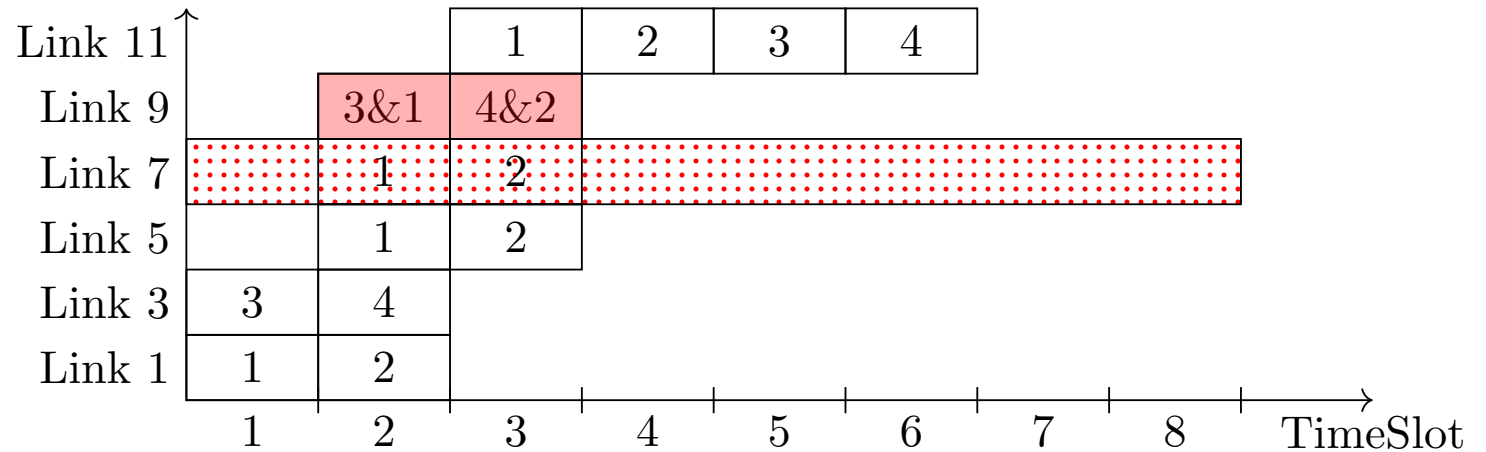
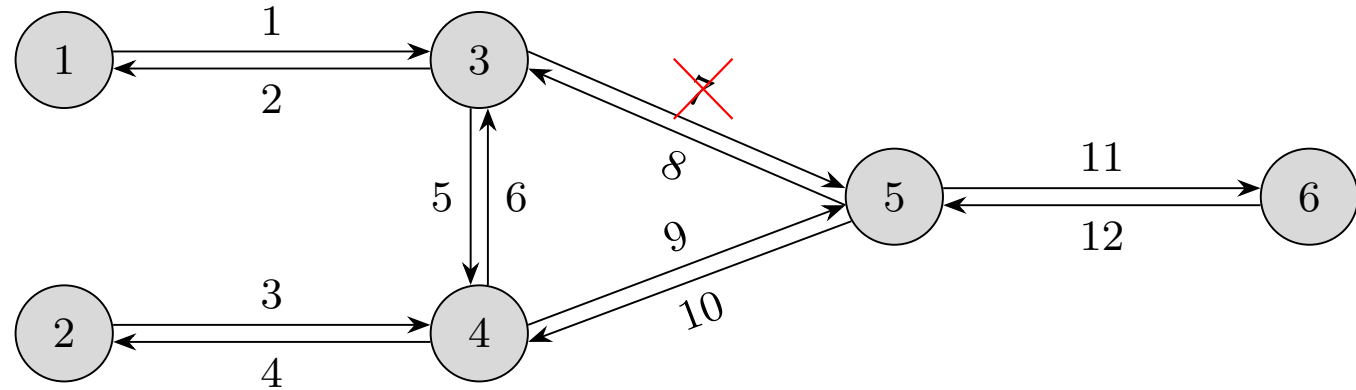
Hot-Patching Protocol

- After a Link Failure
- Patch a small part of the schedule
- As fast as possible
 - Decrease number of lost frames



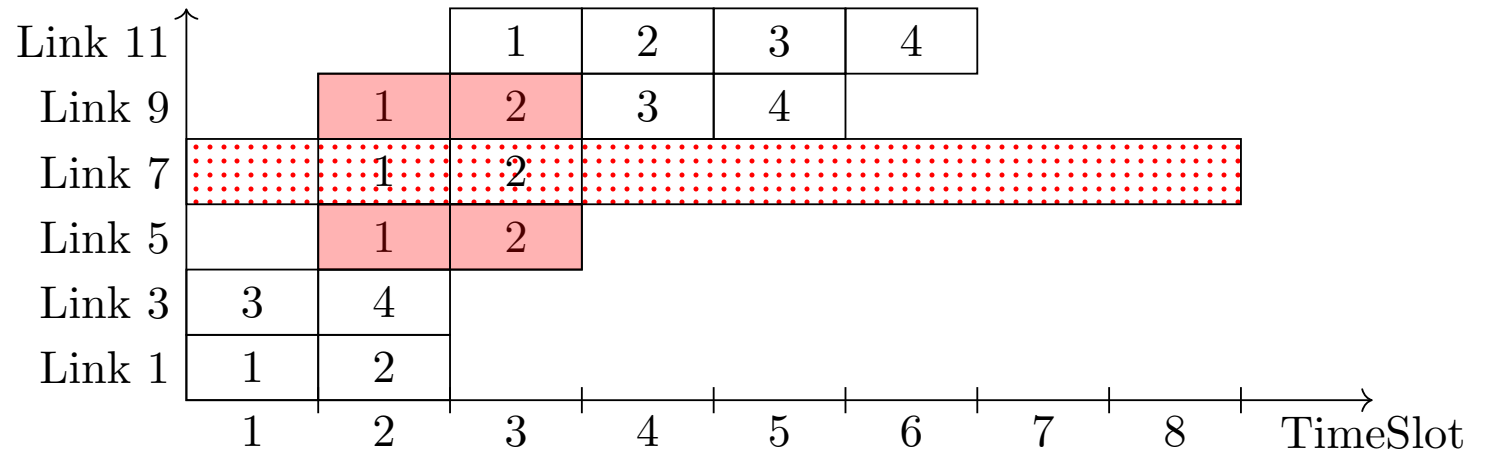
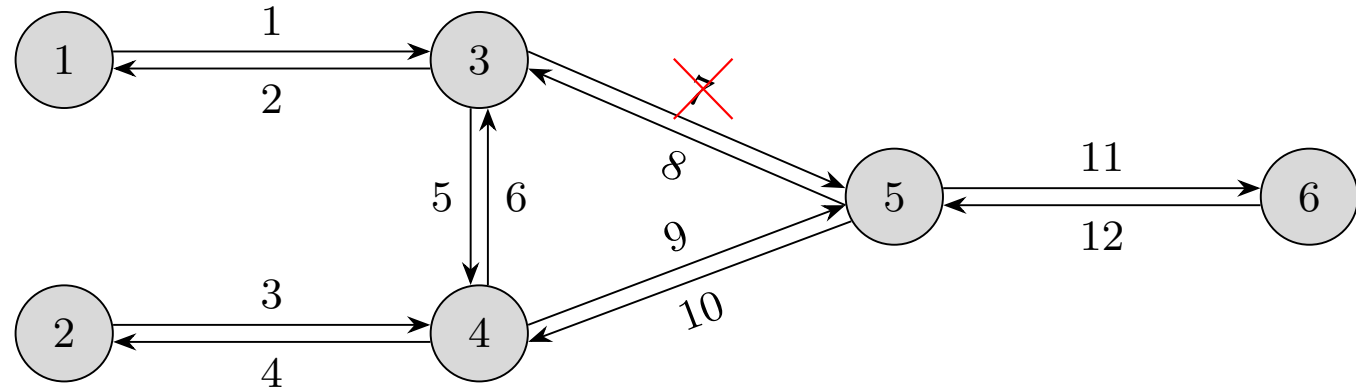
Hot-Patching Protocol

- 4 Steps:
 - Notification
 - Membership
 - Solving
 - Update



Hot-Patching Protocol

- 4 Steps:
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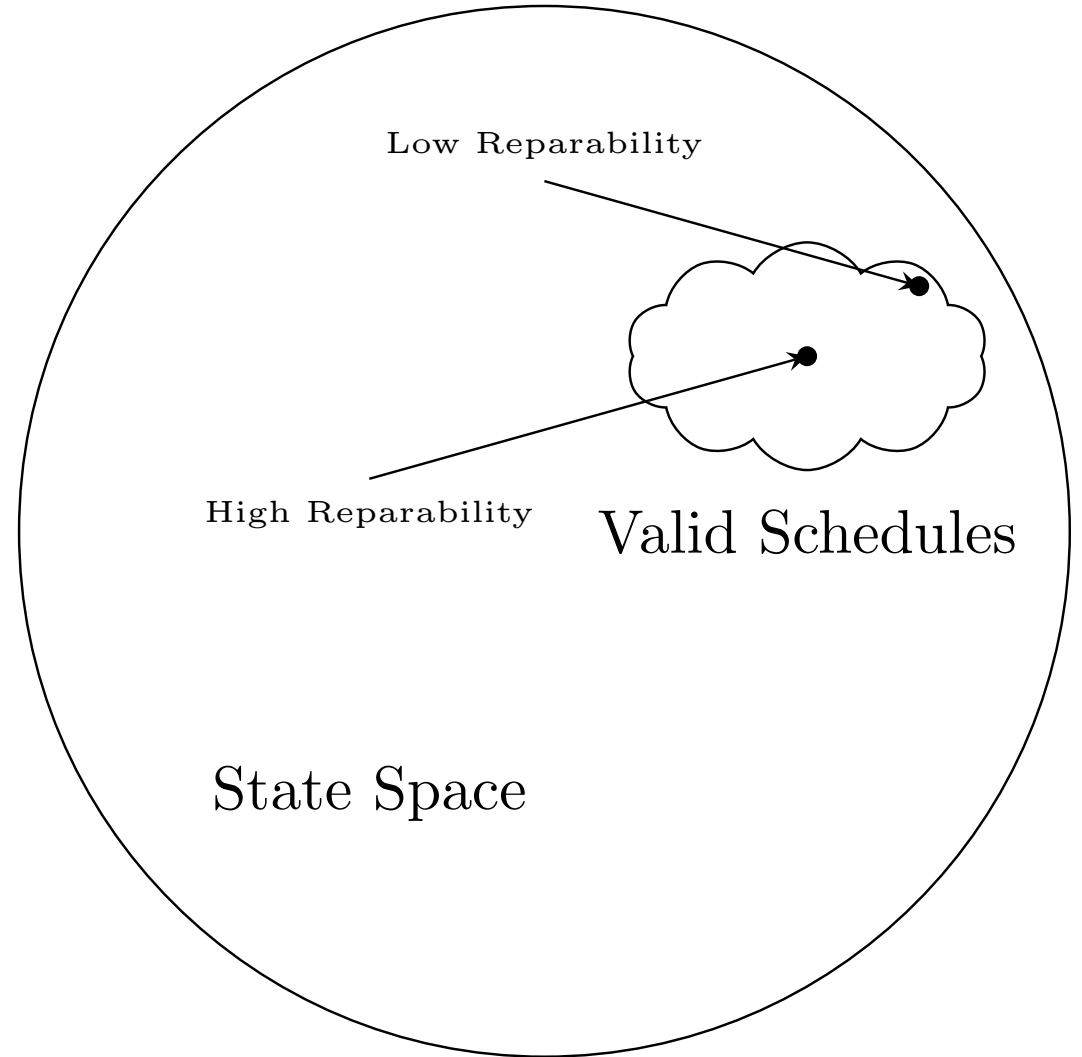


Schedule Reparability

How do we create schedules that are easy to repair?

Schedule Reparability

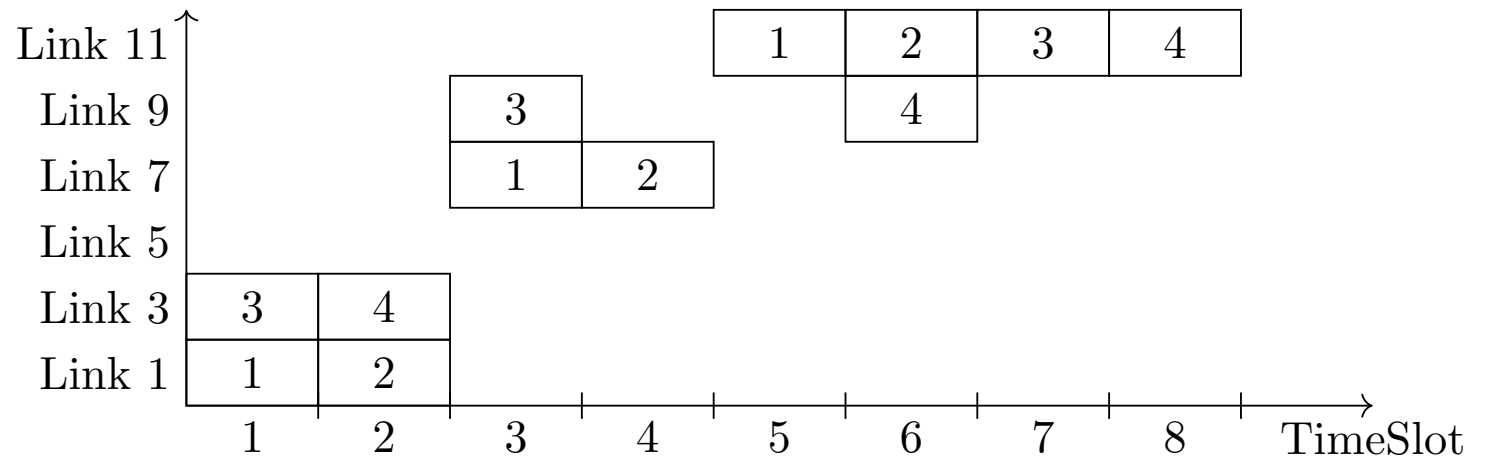
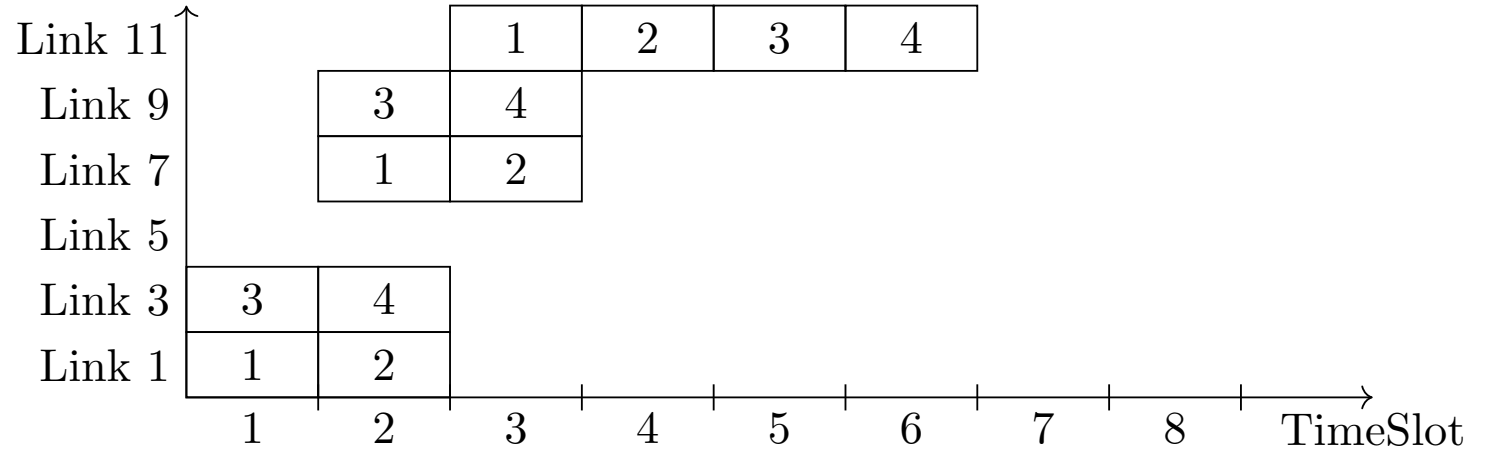
- Choose a High Reparability Schedule
- Low cost to transform to other valid schedules



Schedule Reparability

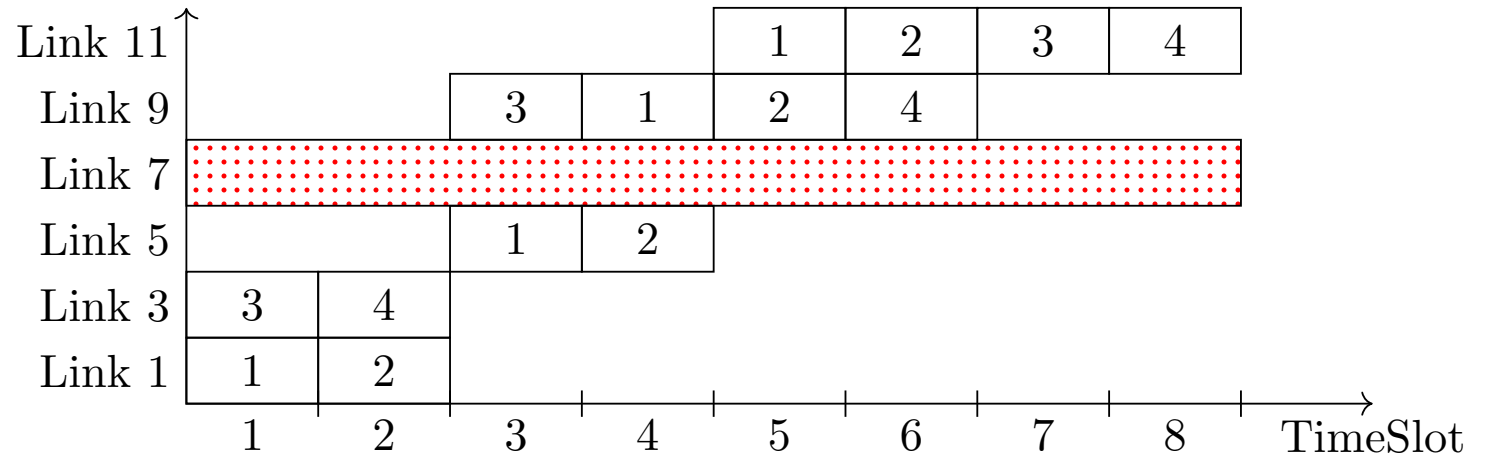
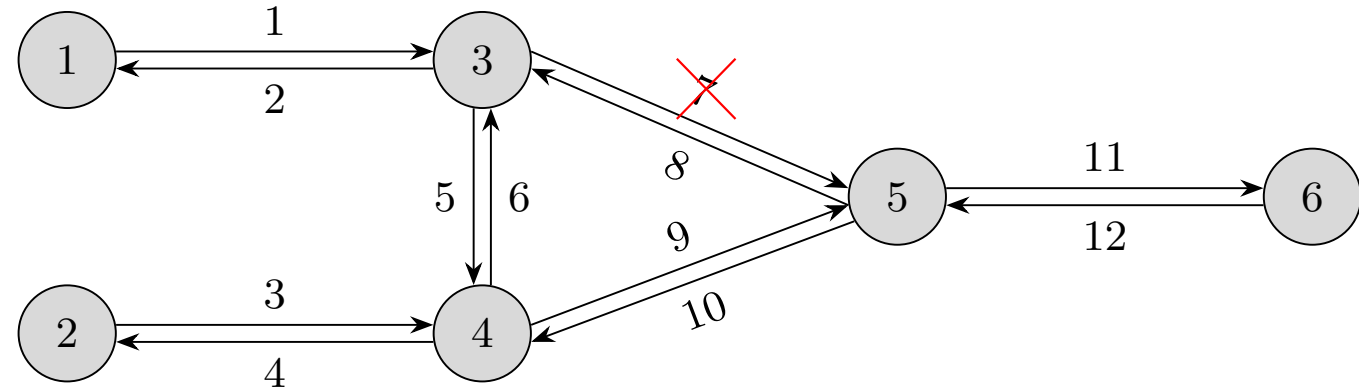
- Maximize Frame Distances

1. Between the same frame
2. Between frames in links



Schedule Reparability

- Minimize the cost transformation
- Allows for fast patching



Reparability: Open Opportunities

- React against different failures:
 - Nodes
 - Unsynchronized frames
 - Network segments
- Ability to modify schedules with small cost:
 - New network components
 - New frames
 - Balance utilizations over links
- Others?