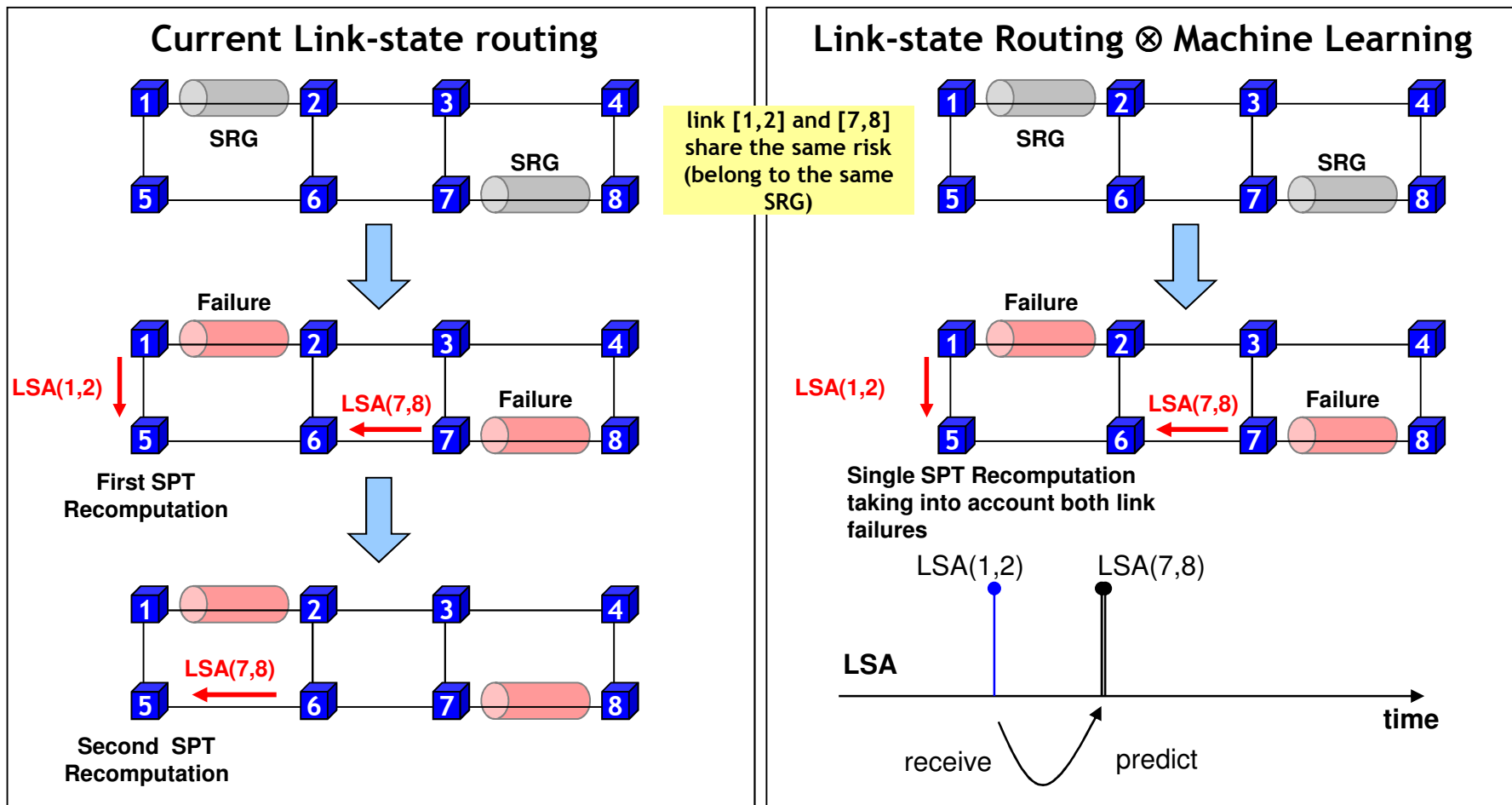


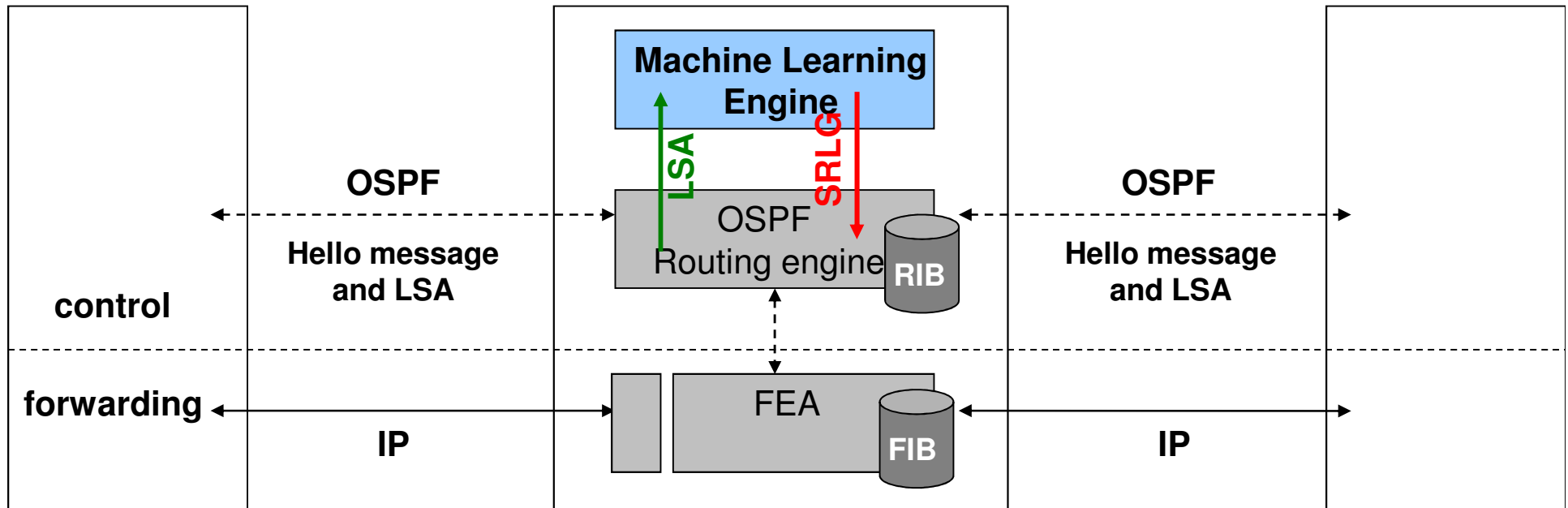


ECODE Usage of IBBT Virtual Wall (iLab.t)

SRLG detection and identification from mining of link state protocol data

Infer Shared Risk Group (SRLG) from Link state routing information (LSA) arrival pattern to prevent successive SPT re-computation upon shared-risk failure (affects multiple links simultaneously)



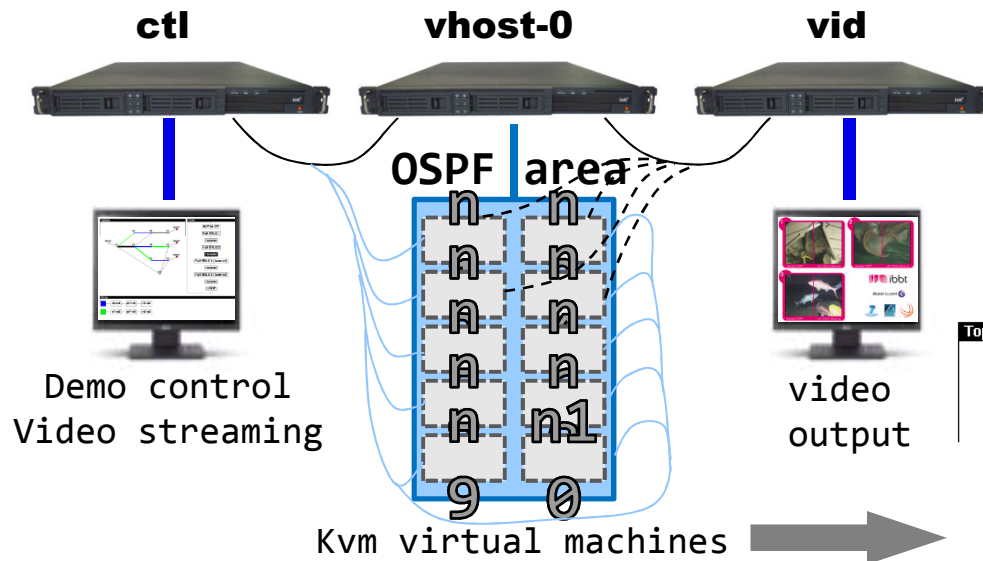


XORP
eXtensible Open Router Platform

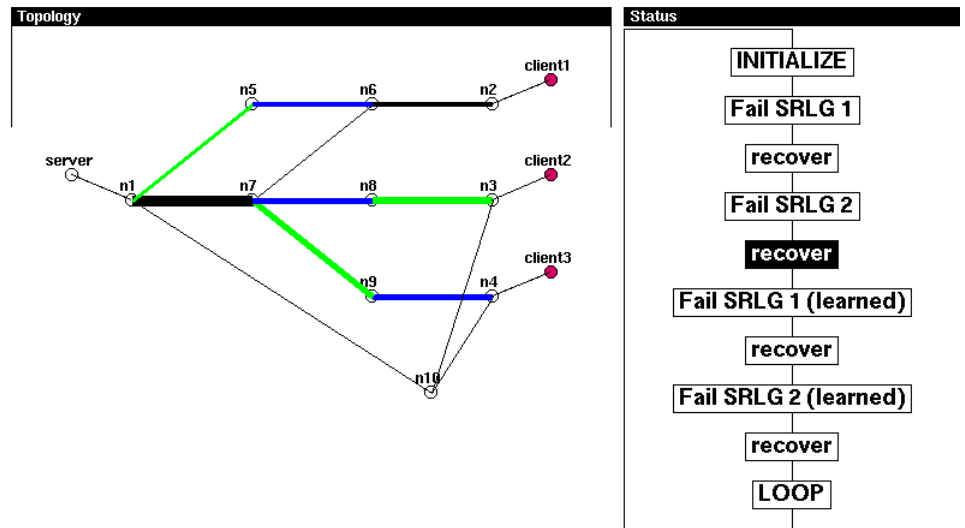
- Simultaneous network failures inferred from advertized LSAs
- Probabilistic SRLG information passed to OSPF (used during shortest path tree computation)
- SRG inference based on locally available information only (local OSPF link state DB)

Experimental Setup

- OSPF area: one router with SRLG inference capability
- iLab.t setup

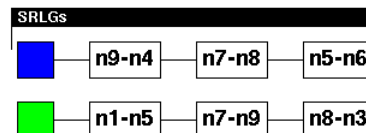


emulated topology



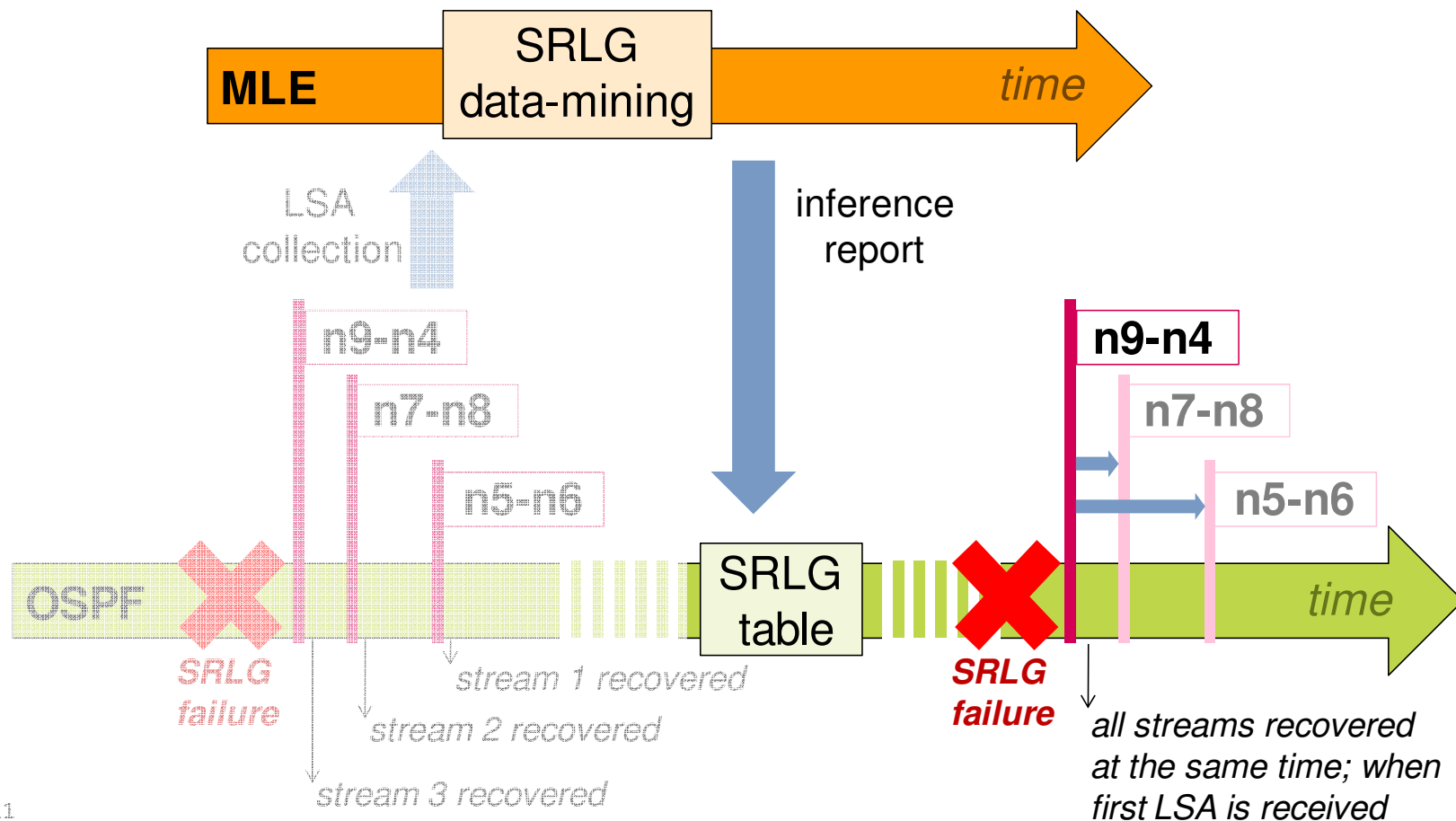
Shows status of the OSPF area

- coloring (matching learned SRGs) and fail state;
- real-time bandwidth (fluctuating line width);
- server and three clients (video stream endpoints).



Demonstration - recovery times

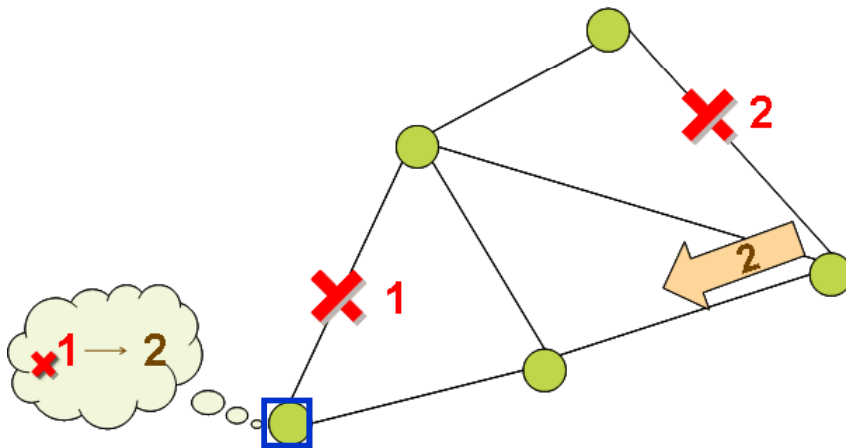
- SRLG not learned: traffic flows recovered one by one as the failing link in their respective path becomes known through LSAs (spread out in time by seconds)
- SRLG learned



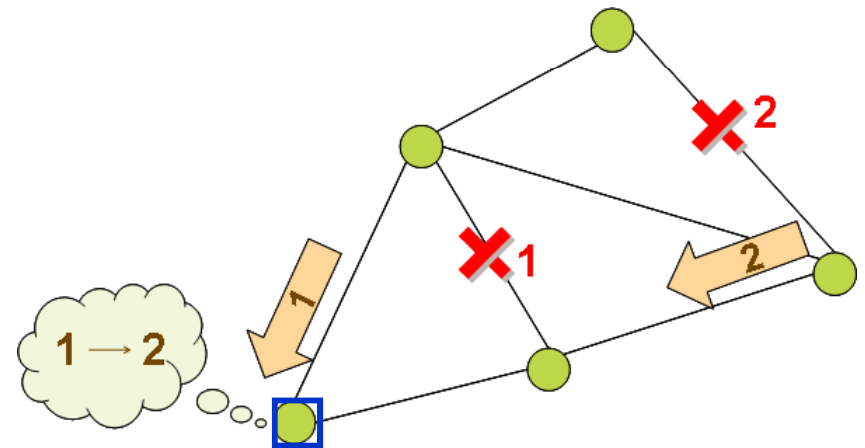
What did we learn ?

- SRLG inference through machine learning can be executed (XORP \leftrightarrow MLE)

For failures of SRLG containing at least one adjacent link: recovery time almost equal to local failure detection time (~100ms) - instead of 1s in standard OSPF



For failures of SRLG containing only non-adjacent links: once the first failing link is known, all flows can be recovered at the same time by the "inferring" node



The iLab.t exp. platform enables i) to control at fine-granularity of (changes in) routing protocol and machine learning component operations wrt network running conditions (key to understand experimental output) and ii) to produce repeatable and reliable results