CrystalBall

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Motivations

- model checkers can't search to any real depth in reasonable time
- subtle bugs can exist in running systems indefinitely

CrystalBall

- consistency checker for deployed distributed systems
- influences running system to avoid problems

Abstractions

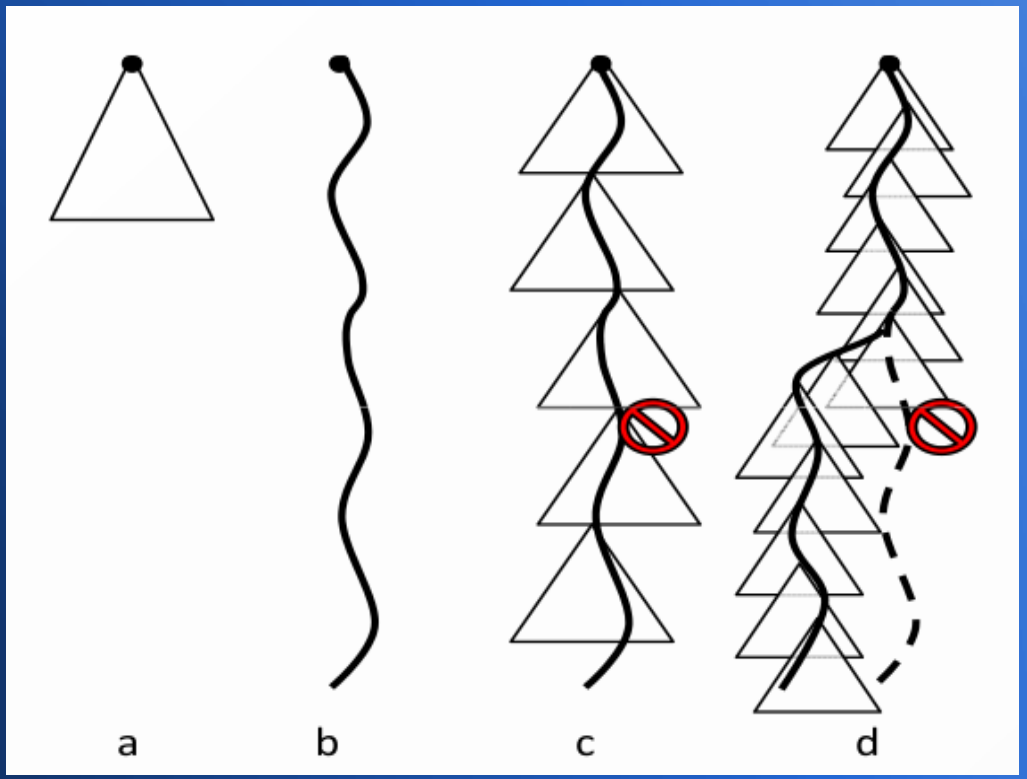
- predicates
- consistent snapshots
- a node's “neighborhood”

Consistency violation detection

- check predicates against neighborhood
- checks as much as possible, runs until cut off

Execution steering

- event filters prevent inconsistent states before they happen
- proceeds along likely safer paths



Immediate safety checks

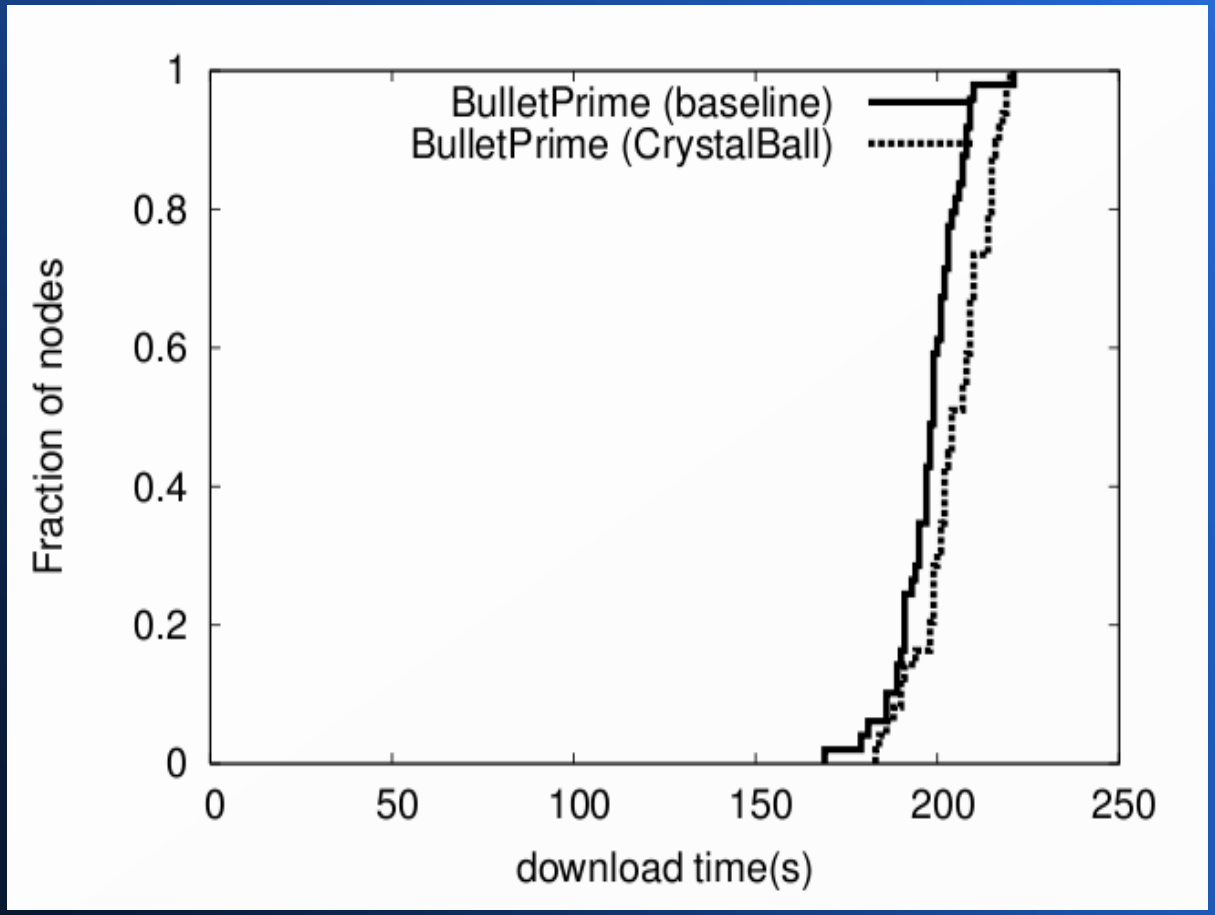
- check possible states from allowing handler to run
- if the result is an inconsistent state, don't

CrystalBall vs. D³S

- less ambitious, but
- real-time
- benefits on first iteration

Results – bug detection

Results – performance impact



Results – performance impact