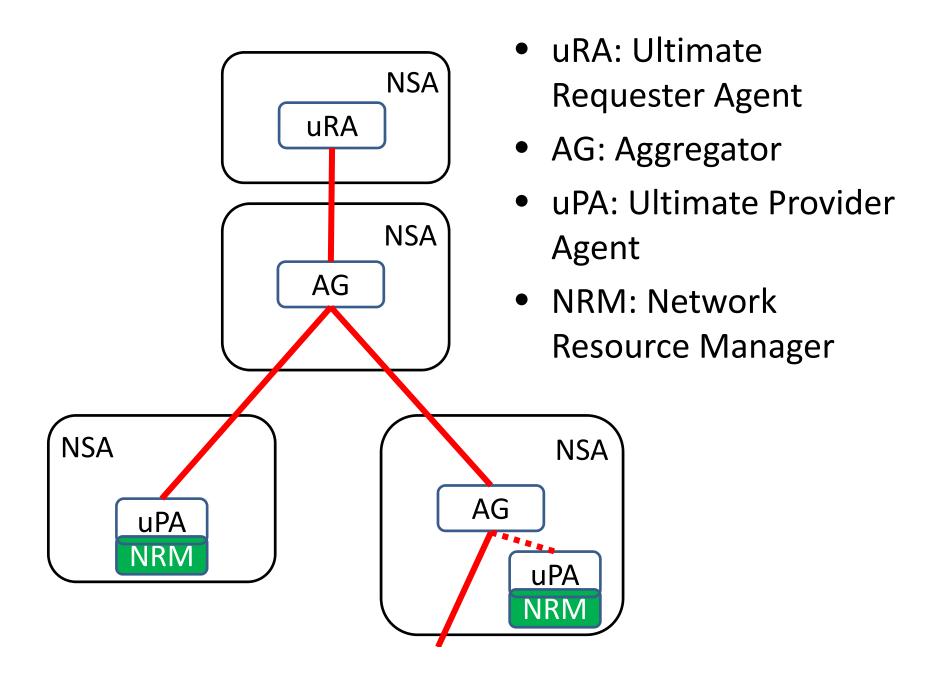


NSI CS Protocol State Machines

Mar. 11, 2013 @ OGF37 Charlottesville

Tomohiro Kudoh

NSA: uRA, Aggregator and uPA

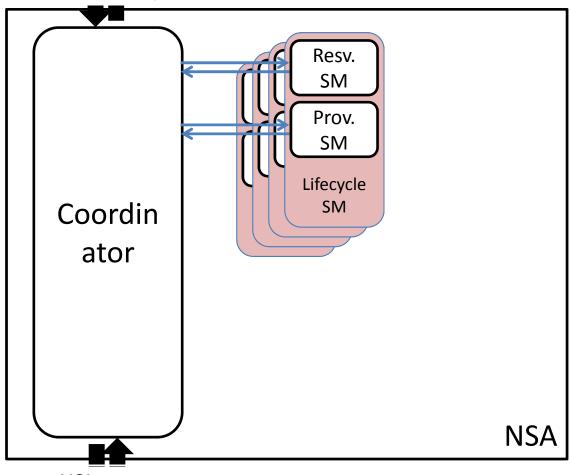


State Machines and Coordinator

- Behavior of NSI CS protocol is modeled as state machines and coordinator
- State Machines:
 - RSM: Reservation State Machine
 - PSM: Provision State Machine
 - ASM: Activation State Machine
 - LSM: Lifecycle State Machine
- Aggregator:
 - can talk to upstream and downstream NSAs
 - Has RSM, PSM and LSM
- uPA
 - Can talk to upstream NSAs only
 - Has RSM, PSM, ASM and LSM

Aggregator

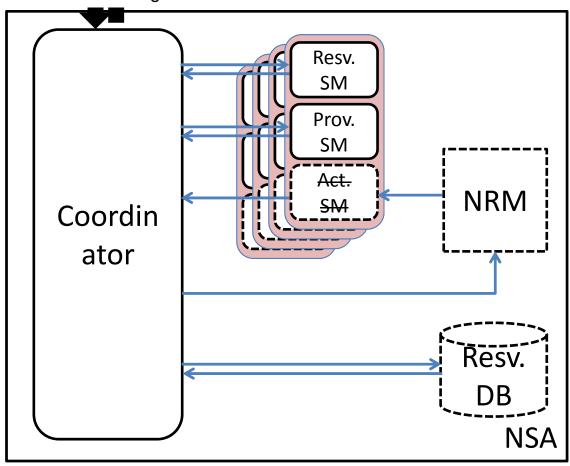




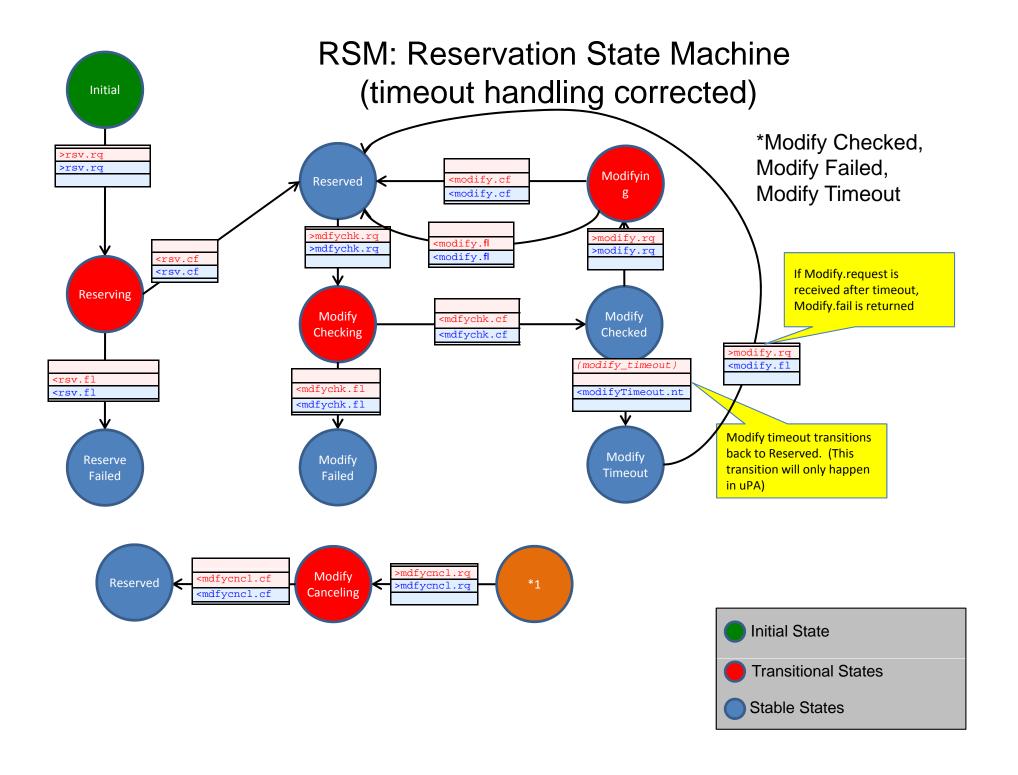
NSI message

uPA



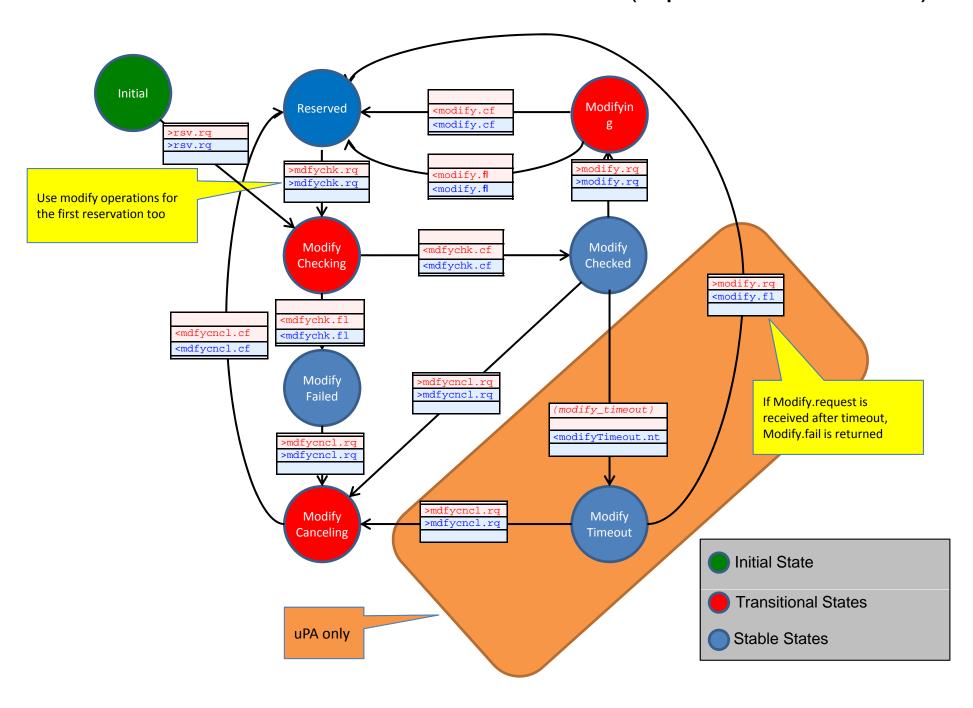


RSM: Reservation State Machine (original) Initial >rsv.rq >rsv.rq Modifyin <modify.cf Reserved <modify.cf</pre> g *1:Modify Checking, >mdfychk.rq modify.rq Modify Checked, <rsv.cf Modify Failed, Reserving **Modify Timeout** Modify Modify <mdfychk.cf Checking Checked and Reserved <mdfychk.cf (modify_timeout) <rsv.fl <mdfychk.fl <rsv.fl <modifyTimeout.nt</pre> <mdfychk.fl Modify timeout transitions back to Reserved. (This Modify Modify Reserve transition will only happen **Timeout** Failed Failed in uPA) **Initial State** mdfycncl.rq Modify <mdfycncl.cf Reserved >mdfycncl.rq Canceling mdfycncl.cf **Transitional States** Stable States



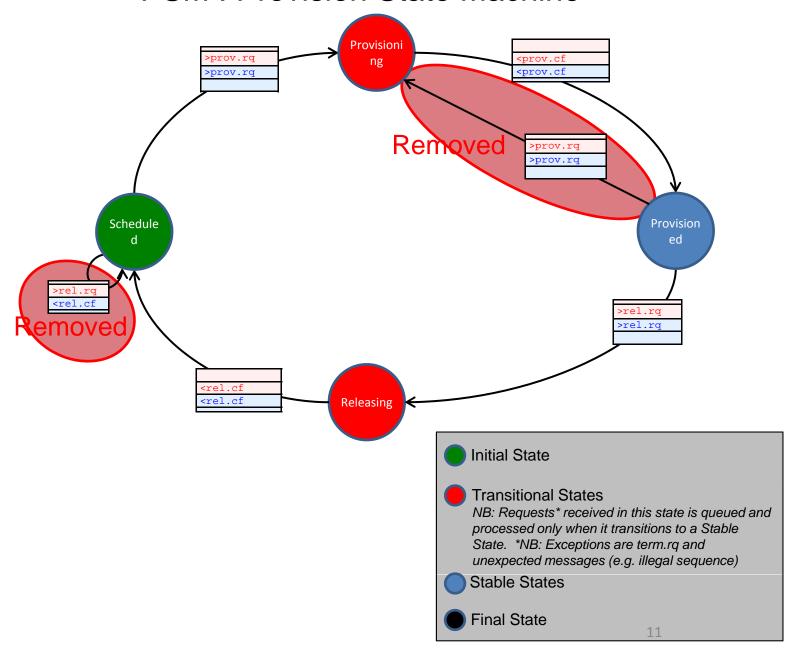
RSM: Reservation State Machine (single diagram) Initial >rsv.rq >rsv.rq Modifyin <modify.cf Reserved <modify.cf g mdfychk.ra cmodify.fl mdfychk.rq >modify.rq <modify.fl <rsv.cf Reserving Modify Modify <mdfychk.cf Checking Checked <mdfychk.cf <modify.fl <rsv.fl <mdfychk.fl <rsv.fl <mdfycncl.cf <mdfychk.fl <mdfycncl.cf Modify Reserve Failed mdfycncl.rq If Modify.request is Failed (modify_timeout) received after timeout, Modify.fail is returned <modifyTimeout.nt</pre> mdfycncl.rq >mdfycncl.rq Modify Modify >mdfycncl.rq Canceling Timeout **Initial State Transitional States** uPA only Stable States

RSM: Reservation State Machine (2-phase reservation)

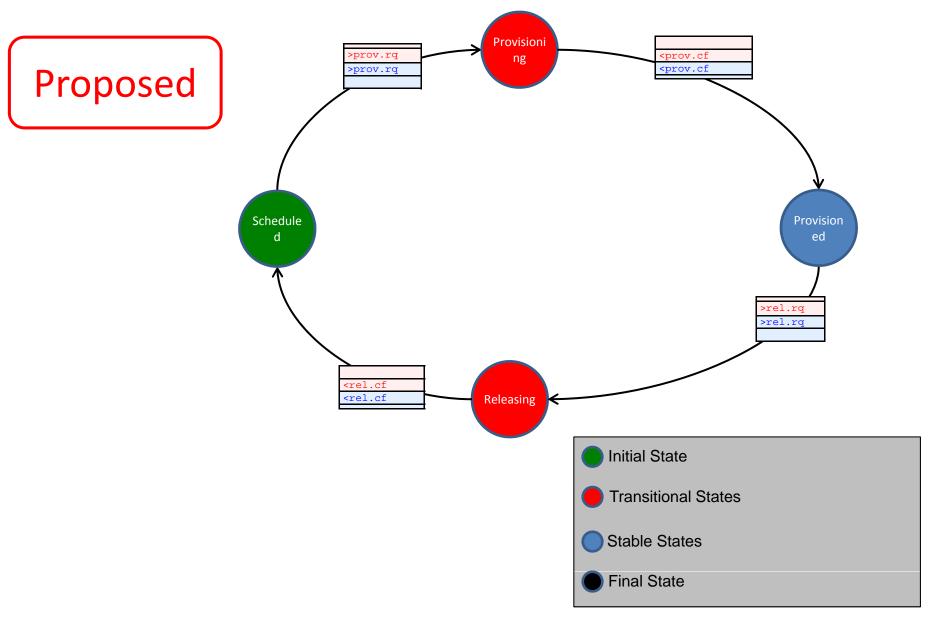


RSM: Reservation State Machine (messages and states renamed) **Proposed** Initial Reserve Reserved Committi <rsvcommit.cf >rsv.rq rsv.rq <rsvcommit.fl</pre> >rsv.rq >rsvcommit.rq Rsv.rg is used for both the <rsvcommit.fl initial reservation and modification after Reserve Reserve <rsv.cf Held Checking <rsv.cf <rsvcommit.fl <rsvabort.cf <rsv.fl <rsvabort.cf</pre> Reserve Failed >rsvabort.rq If rsvcommit.rq is received (reserve timeout after timeout, rsvcommit.fl is returned <rsvTimeout.nt</pre> >rsvabort.rg >rsvabort.rq Reserve Reserve >rsvabort.ro Aborting **Timeout Initial State Transitional States** uPA only Stable States

PSM: Provision State Machine

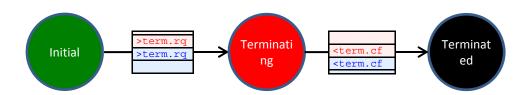


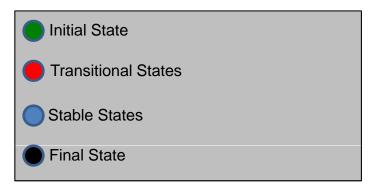
PSM: Provision State Machine



LSM: Lifecycle State Machine

Proposed





12/03/2013