

Key Aspects of eVLBI Network Design with Emphasis Between BoSSNET's POP at ISI-E and the GGAO at GSFC

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Preface

- All info is essentially DRAFT; much more detailed planning is required
- This info makes many assumptions few of which are yet adequately described but all need to be
- Further planning needs to be based better on a clearer understanding of this project's requirements, timetable, and actual funding support
- All references to UMCP-led Mid-Atlantic Crossroads (MAX) cooperation is assumed, but no MAX commitments have yet been negotiated; we just haven't yet had time to discuss this more thoroughly with them

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Proposed eVLBI Phase 1 “Shared GE” Test Configuration

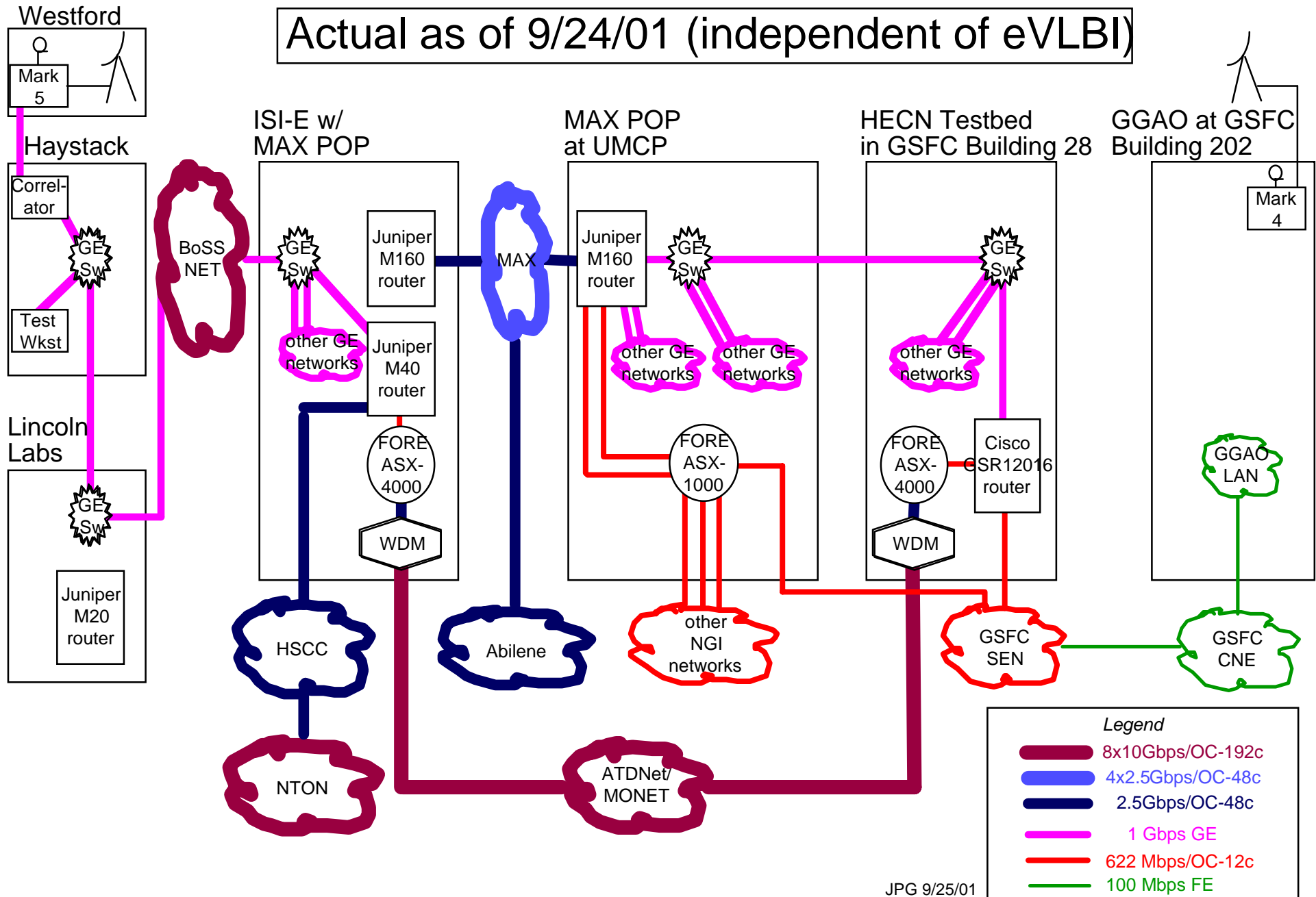
- Achieves approximately 1 Gigabit per second (GB ° bps) end-to-end but can only be used for time-limited demos as it uses shared MAX and GSFC/High End Computer Network (HECN) project network infrastructure between ISI-E and GGAO

Potential eVLBI Phase 1 “Dedicated GE” Test Configuration

- Builds on technical approach validated in Phase 1 replacing shared MAX and GSFC/HECN network infrastructure with eVLBI-dedicated network infrastructure

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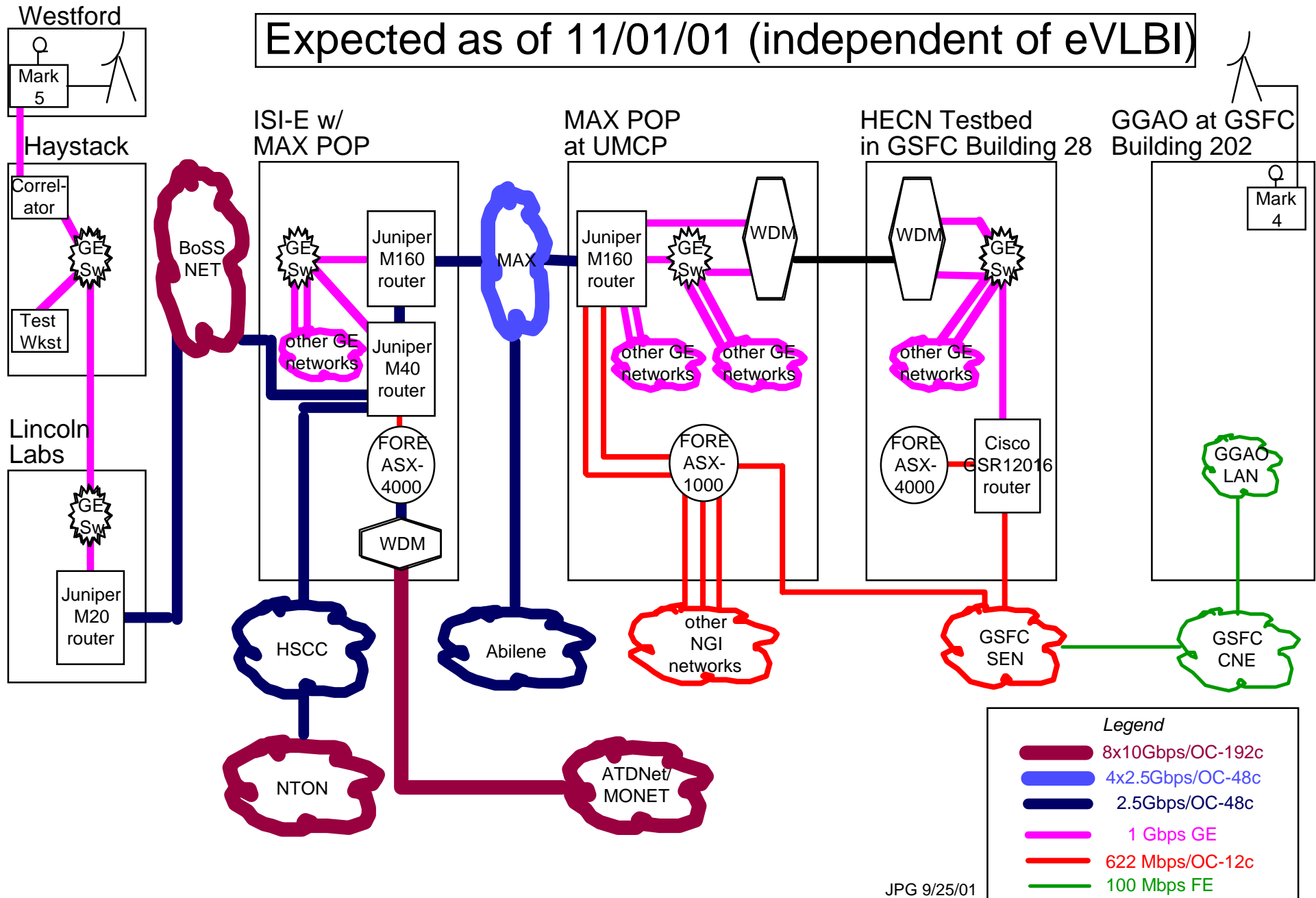
Actual as of 9/24/01 (independent of eVLBI)



JPG 9/25/01

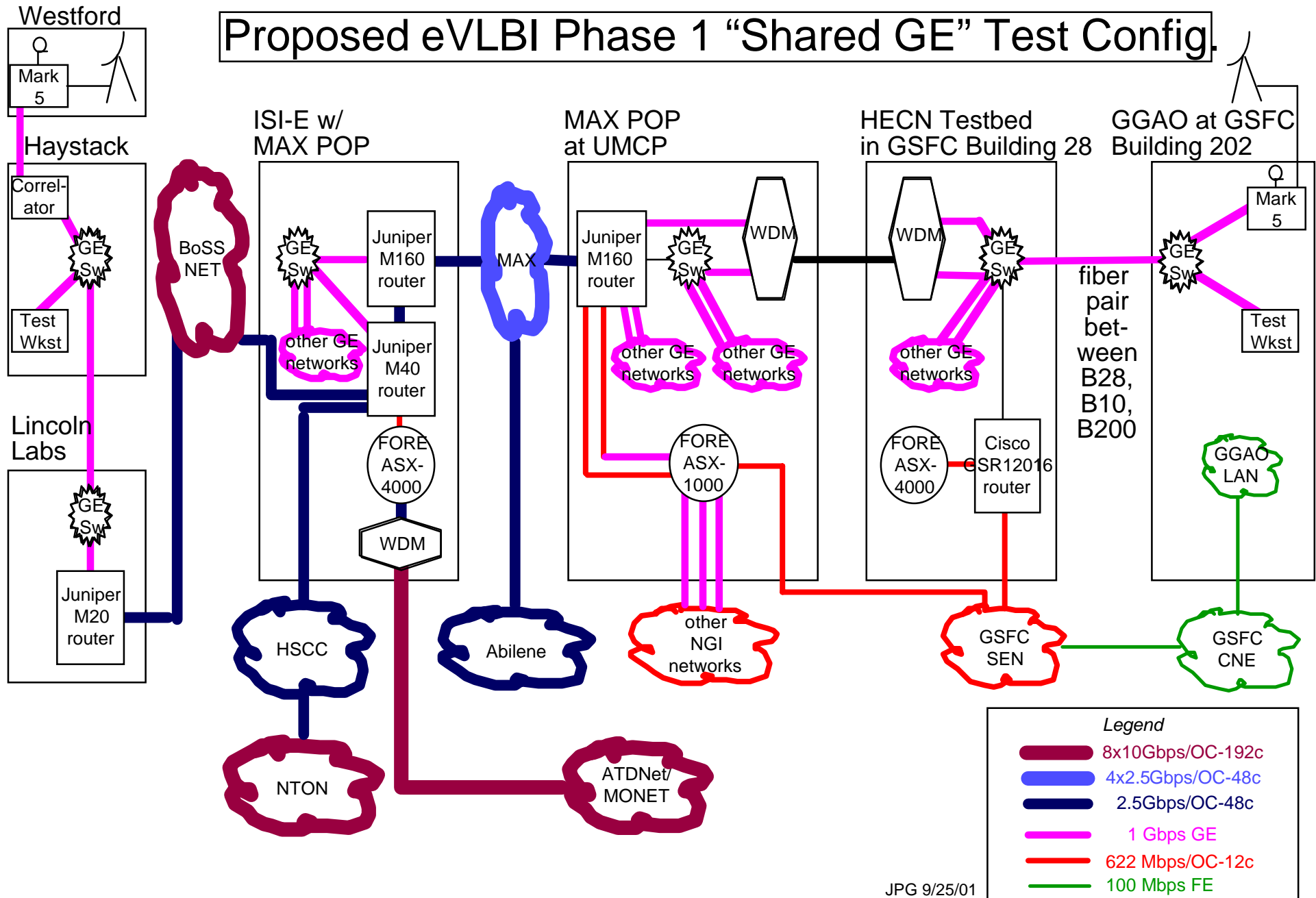
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Expected as of 11/01/01 (independent of eVLBI)



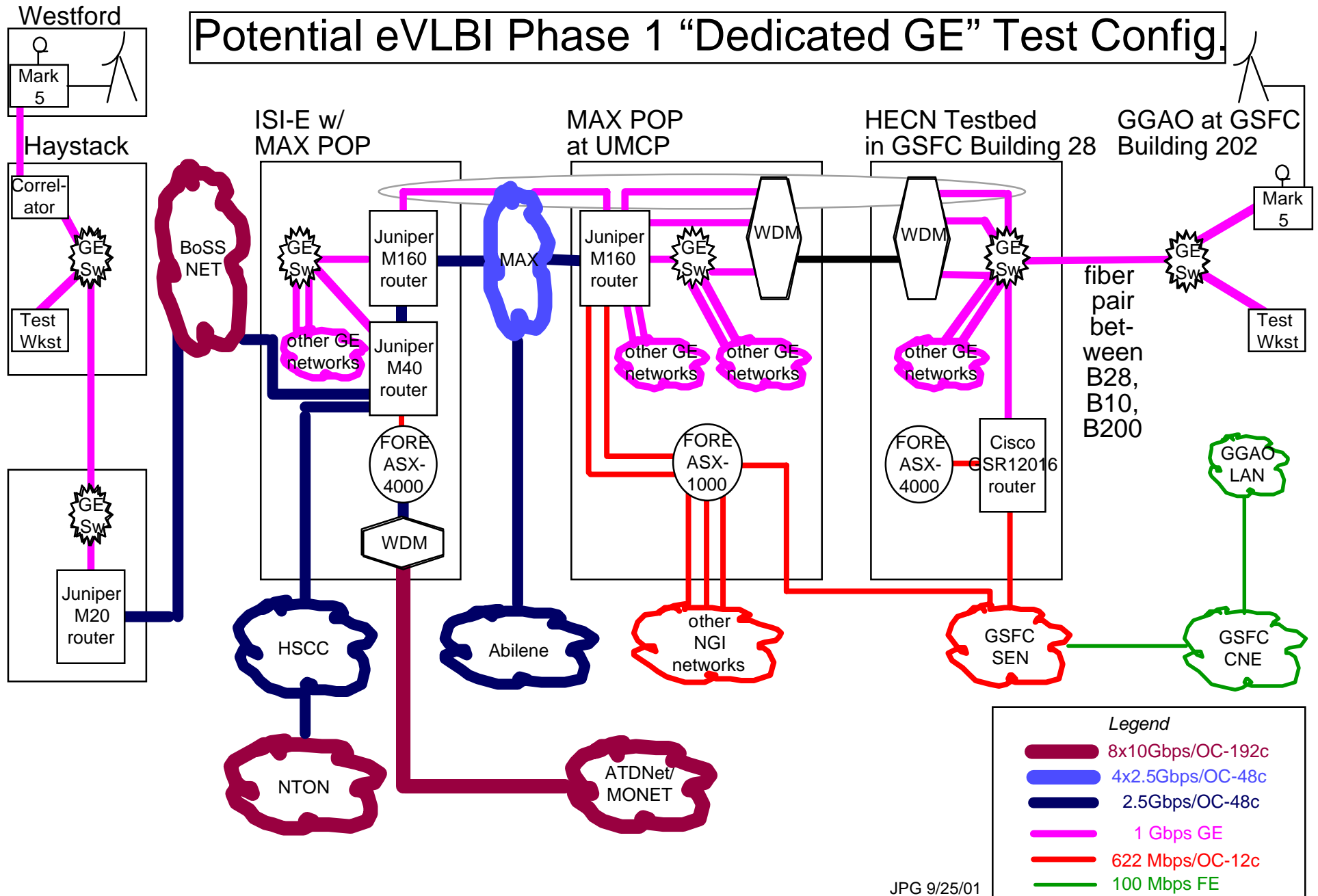
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Proposed eVLBI Phase 1 "Shared GE" Test Config.



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Potential eVLBI Phase 1 "Dedicated GE" Test Config.



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Phase 1 Notes

- At Haystack and MIT/LL
 - » Info source is Haystack's Alan Whitney and MIT/LL Steven Bernstein's 5/1/01 "Lincoln Optical Fiber Network Infrastructure" ppt
 - » Assumes a VLBI Mark 5 unit or a VLBI Correlator and at least one suitable workstation are Gigabit Ethernet (GE) connected to a Haystack local GE switch which is connected through MIT/LL (details not important here but are available from MIT/LL or Haystack) to BoSSNET
 - » Workstation will be used for end-to-end checkout testing with a comparable workstation unit at GGAO
 - » Questions/issues:
 - TBD

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Phase 1 Notes

- At ISI-E

- » Info source is ISI-E's Tom Lehman
- » Leverages BoSSNET's existing termination/CPE user interface which presently is essentially a GE to a local GE switch (and is planned to be replaced with a 2.4 Gbps POS user interface to the ISI-E's M40 router)
- » Assumes Supernet/BoSSNet IP peering with MAX is pre-arranged (to be resolved between DARPA and MAX)
- » Assumes "simple" physical GE switch interconnection among BoSSNET, ISI-E GE switch, and MAX's M160 router (until replaced by 2.4 Gbps POS interconnection among BoSSNET, ISI-E M40 router, and MAX's M160 router)
- » Questions/issues:
 - Maximum MTU size of M160 supported frames - 4470 bytes?

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Phase 1 Notes

- At MAX's UMCP site

- » Info sources are GSFC's Bill Fink and MAX's Jerry Sobieski and Dan Magorian
- » Leverages GSFC/HECN's existing and planned GE interfaces to MAX's M160 and GE switch over today's existing (only) one fiber pair*. One GE link exists today to/from a Cisco 3508. GSFC/HECN-acquired Course WDM with two GE lambdas for this fiber pair is expected to be installed before 11/01/01.
 - *One other fiber pair exists but is dedicated to a semi-operational function
- » Questions/issues:
 - What is the UMCP host (M160 or GE switch) for each of the GE lambdas?
 - Jumbo frames are not presently supported on existing GE switch, but MAX may be planning an upgrade soon. This need more investigation and discussion.

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Phase 1 Notes

- At GSFC/HECN's Building 28 site
 - » Info sources are GSFC's Bill Fink and Paul Lang
 - » Leverages GSFC/HECN's existing and planned GE interfaces to MAX's M160 and GE switch over today's existing (only) one fiber pair*. One GE link exists today to/from a Cisco 3508. GSFC/HECN-acquired Course WDM with two GE lambdas for this fiber pair is expected to be installed before 11/01/01.
 - *One other fiber pair exists but is dedicated to a semi-operational function
 - » Questions/issues:
 - What is the HECN host (GSR 12016 or GE switch) for each of the GE lambdas?
 - Jumbo frames are not presently supported on existing GE switch, but an Extreme Network Summit 5i with jumbo frame support should be installed before 11/01/01.
 - Need one LX/1000BaseT converter for the Summit 5i

~\$ 2K

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Phase 1 Notes

- At GSFC/GGAO's Trailer near Building 202 site
 - » Info sources are GSFC's Lee Foster, Herb Durbeck and Scott Douglas
 - » Need fiber pair between B28/W220 (via B10) and GGAO trailer near B202
 - Douglas' 7/2/01 email identified cost of a fiber pair between B28 and Area 200 ~\$10K
 - » Need GE switch with jumbo frame support at GGAO
 - Recommend Extreme Network Summit 1i with one LX and two 1000BaseT ports ~\$ 6K
 - » Proposes Mac G4 with 1000BaseT GE NIC as test workstation
 - Similar to Fink's recent acquisitions ~\$ 3K
 - » Assumes a VLBI Mark 5 unit with 1000BaseT GE NIC
 - » Questions/issues:
 - Need to confirm Mark 5's GE NIC is 1000BaseT

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Potential eVLBI Phase 1 “Dedicated GE” Test Configuration

(Same as Phase 1 “Shared GE” Test Config except were noted)

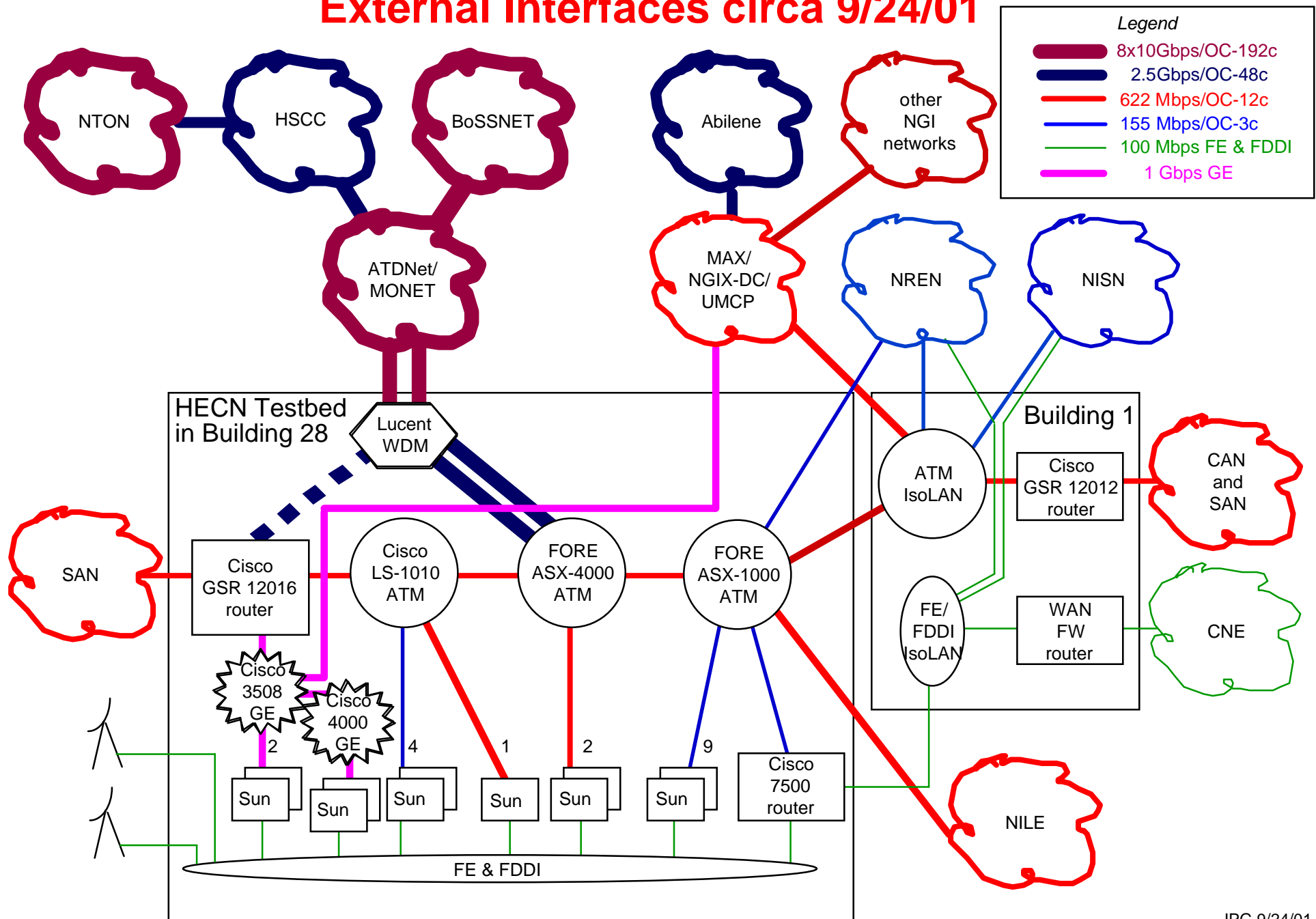
- At Haystack and MIT/LL: no change
- At ISI-E:
 - » Need one additional GE port on M160 ~\$13K
- Between MAX/ISI-E and MAX/UMCP:
 - » Need additional fiber pair or lease a lambda from MAX TBD
- At MAX/UMCP:
 - » Need two additional GE ports on M160 ~\$25K
- Between UMCP and GSFC/HECN
 - » Need additional fiber pair or add a lambda ~\$20K
 - » Need additional LX GE port on HECN GE switch ~\$5K

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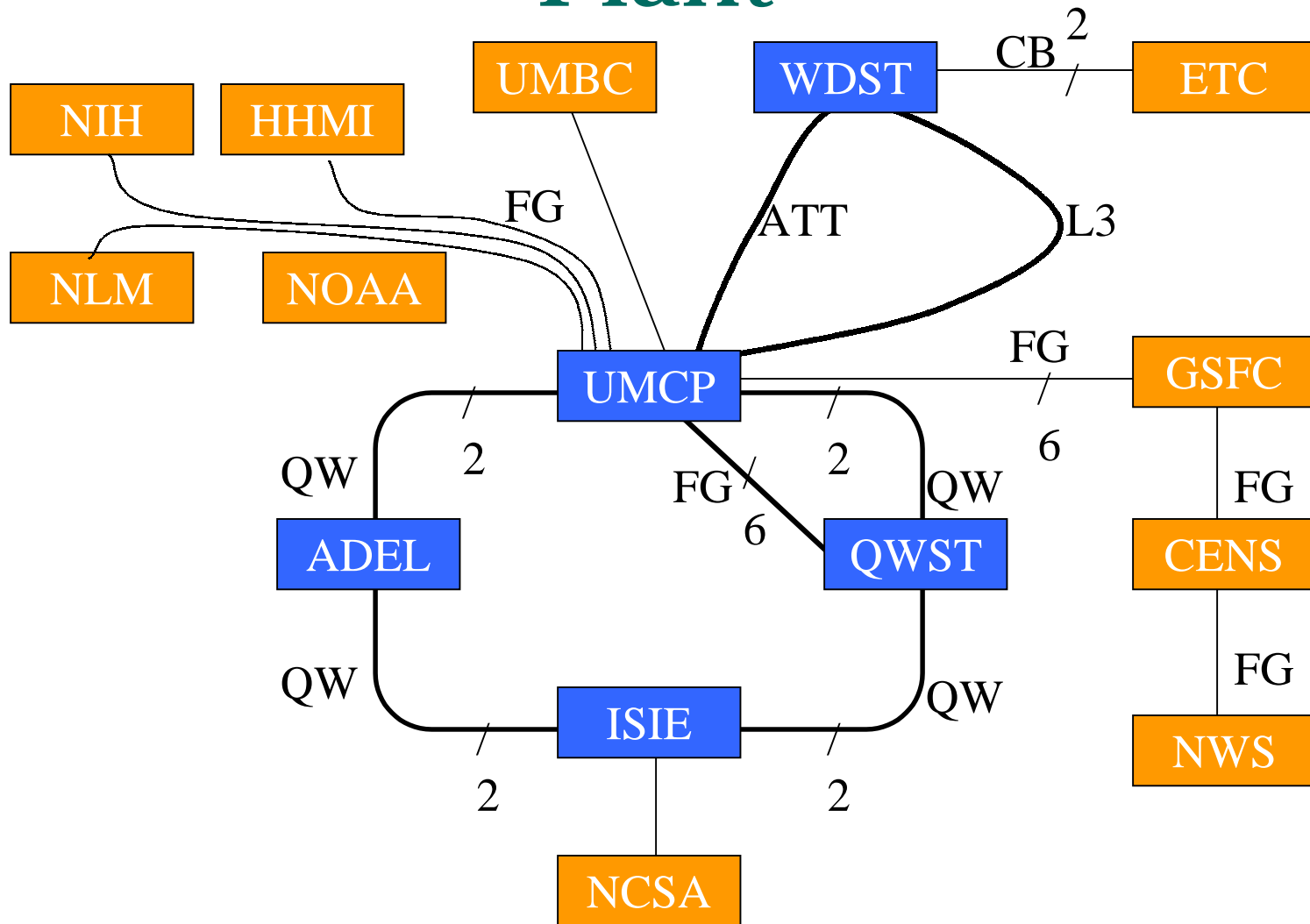
Backup Charts

GSFC High End Computer Network (HECN) Testbed

External Interfaces circa 9/24/01



MAX Fiber Infrastructure Plant



Target Core Optical Network

