Course Description
This is one of the main courses on IP routing protocol series designed to teach the current state of art for Internet routing. The course covers Internet evolution, RFC specifications for BGP routing and its extensions, vendor BGP implementation and configuration syntax, and routing policy and implementation in enterprises and Internet service providers networks (ISP). The topics includes BGP4 standards, BGP protocol states, BGP routing attributes, BGP decision algorithm, route-reflector and AS confederation (iBGP), BGP routing policy, traffic load-balancing and routing redundancy, BGP damping, MP-BGP, L2-/L3-VPN with MPLS and BGP convergence.

Prerequisites
Students must finish at least TCOM509, TCOM514/515 equivalence before taking this class. TCP/IP protocols, IP routing basics, and IP addresses knowledge are assumed. Students are also recommended to take IGP routing course (TCOM609) before or after taking this BGP course.

Location & Time
Fairfax Campus, Enterprise Hall 205, Tuesday, 7:20-10:00PM, August, 31 – December 12, 2008

Instructor
Dr. George Y. Wu, ywu5@gmu.edu or yunqing_wu@yahoo.com
Teaching Assistant: TBD
Office Hour: By email, or by appointment only

Textbooks

References


Grading and Projects
There will be one mid-term exam and one final exam. All exams are closed book. There will be one individual project. Students are required to submit the project to the instructor prior to the due date electronically. Late projects will not be accepted unless the prior permission has been granted. Your final course graded will be calculated as follows:

Mid-term  30%
Final Exam  30%
Project  40%

Tentative Schedule
Week1 Overview of TCP/IP, IP routing and addressing (Sept 1)
Week2 BGP protocol specification RFC4271 (Sept 8)
Week3 BGP configuration and BGP attributes; Lab Demo (1) (Sept 15)
Week4 BGP Decision process and BGP Policy (Sept 22)
Week5 Redundancy and Load balancing, BGP Case Study (Sept 29)
Week6 BGP Scaling: IBGP, Route-reflector and AS confederation (Sept 30)
Week7 BGP Troubleshooting, Lab Demo (2) and Mid-term review (Oct 6)
    NO CLASS Oct 13 (Columbus Day for Tuesday class)
Week8 Mid-term and Project discussion (Oct 20)
Week9 ISP Services design and Peering (Oct 27)
Week10 BGP extension: capacity, refresh, BGP security (Nov 3)
Week11 BGP convergence, route damping and performance tuning (Nov 10)
Week12 MPLS and L2/L3 VPN Architecture (Nov 17)
Week13 New Evolution of Internet Routing (Nov 24) Thanksgiving Week
Week14 Review and Project discussion (Dec 1)
Week15 Final Exam (Dec 8)