NMI: A Secure and Scalable Bandwidth Management Platform for Open Market-based Dynamic and Distributed Provisioning DiffServ Interconnection: BMP Project (Sep.2001—Sep.2004)

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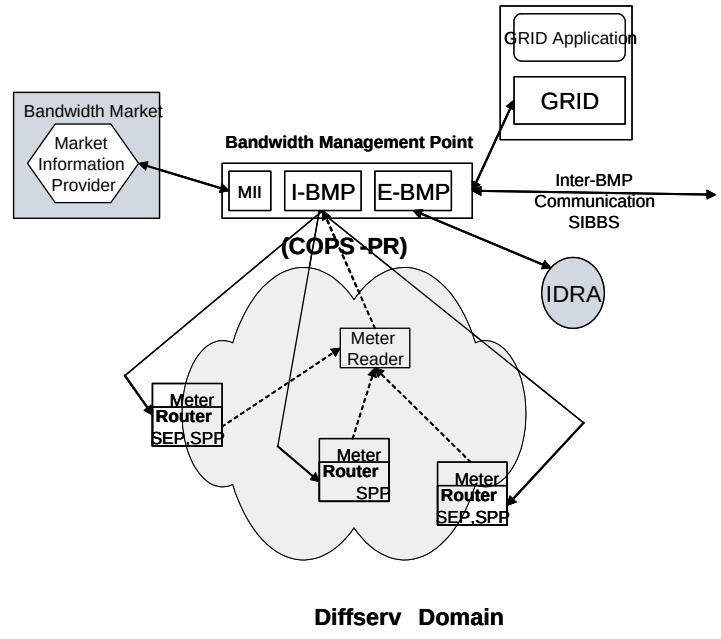
i-MINT Research Lab
(Intelligent-Middleware Information Networking Technology)

Student Researchers:
Two Ph.D. Students, Three M.S. Students,
One Undergraduate Student

Lab and Project Websites:
http://web.syr.edu/~jshwang/

Funding Program:
NSF NMI (NSF Middleware Initiative) Program



BMP Design, Development & Implementation

Goals:

Scalability
Signaling, state, and processing
Security
Cross network dynamic provisioning for the GRIDs
Efficiency
Efficient resource utilization, Economic Efficiency
Deployable
Minimum changes in underlying structure
Compatibility with current tech. (Globus/COPS-PR/…)

Future Project Plan

-- 2003 Summer:
BMP (Bandwidth Management Point) /
TMS (Transaction Management Service)
Toolkit Release (NMI Release)
2003 Spring—Fall:
IDRA (Inter-Domain Routing Agent)
Development
2003 Fall -- 2004 Spring:
Cross-Campus GRID Network Integration
and Testbed Expansion

Project Outcomes
Publications:

Ibrahim T. Okumus, Junseok Hwang, Steve J. Chapin, Haci A. Mantar, “Inter-Domain Traffic Engineering on a Bandwidth Broker Supported Diffserv Internet”, submitted to Applied Telecommunication Symposium (ATS ’03)

Mantar, Haci, Hwang, Junseok, Chapin, Steve, Okumus, Ibrahim, “A Scalable and Efficient Inter-Domain QoS Routing Architecture for Diffserv networks” The Eighth IFIP/IEEE International Symposium on Integrated Network Management (IM 2003), March 2003 in Colorado Springs, Colorado, USA

Mantar, Haci, Hwang, Junseok, Chapin, Steve, Okumus, Ibrahim, "A New Inter-Domain QoS Routing Architecture for QoS-enabled Networks", IASTED International Conference on Communications and Computer Networks (CCN 2002) November 4-6, 2002 Cambridge, USA

Ibrahim Taner Okumus, Junseok Hwang, Haci Ali Mantar, Steve J. Chapin; "Inter-Domain LSP Setup Using Bandwidth Management Points", Proc. of Globecomm2001, Nov 2001, San Antonio, TX, USA.

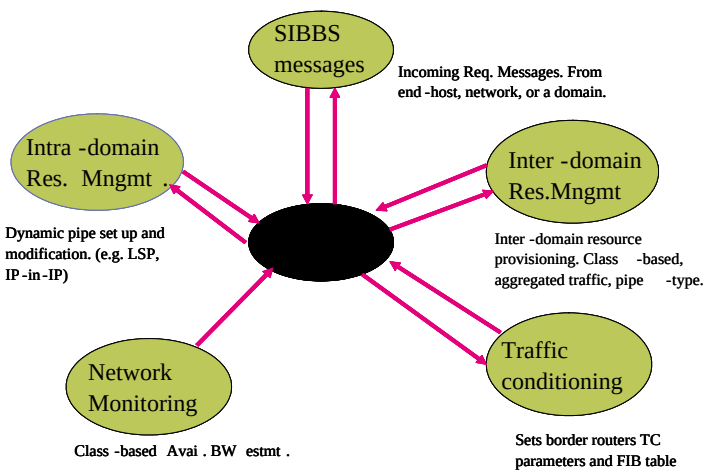
Haci Ali Mantar, Junseok Hwang, Ibrahim Taner Okumus, Steve J. Chapin, “Inter-domain Resource Reservation via Third-Party Agent”, SCI 2001.

Haci A. Mantar, Junseok Hwang, Ibrahim T. Okumus, Steve J. Chapin, “Edge-to-edge Resource Provisioning and Admission Control in DiffServ Networks” IEEE SoftCOM 2001, October, 2001 Split, Dubrovnik (Croatia) Ancona, Bari (Italy)

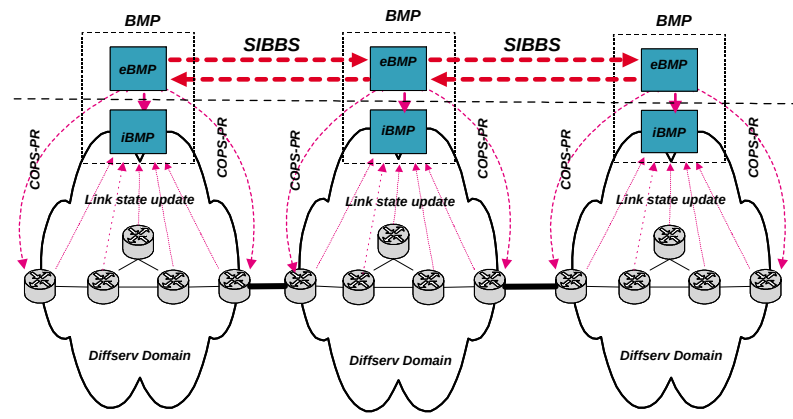
Software:

BMP/TMS Toolkit

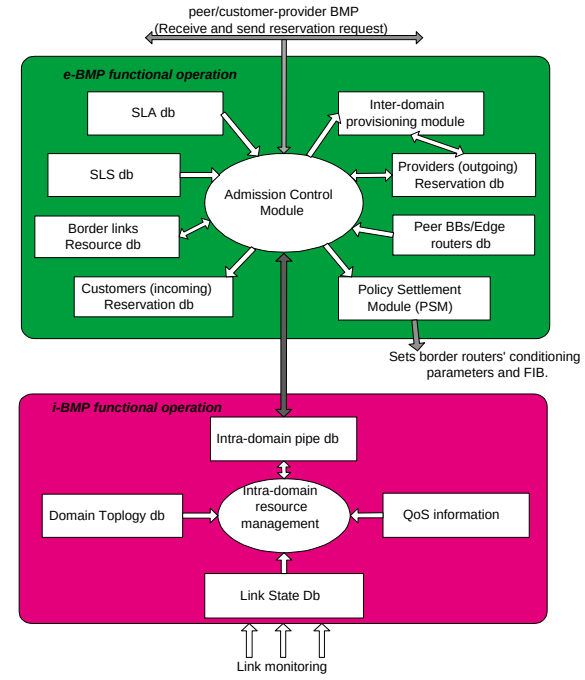
Bandwidth Management Point Architecture



BMP module Diagram

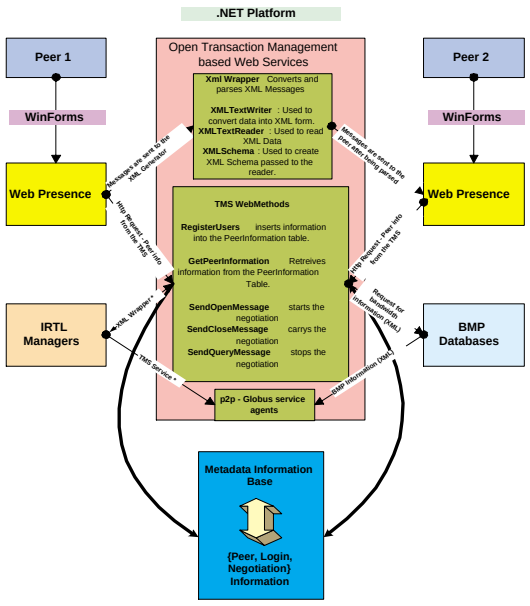


Inter-domain Resource Reservation and provisioning

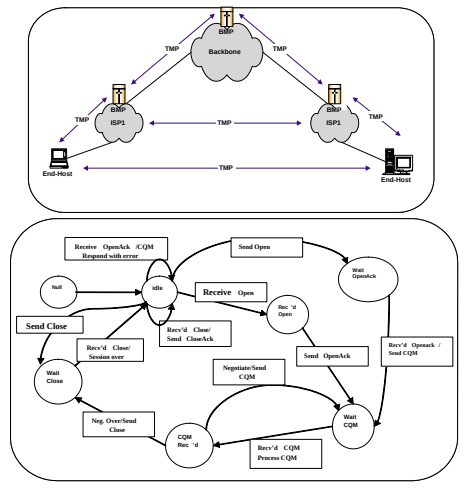


Transaction Management Services

Transaction Management System Architecture

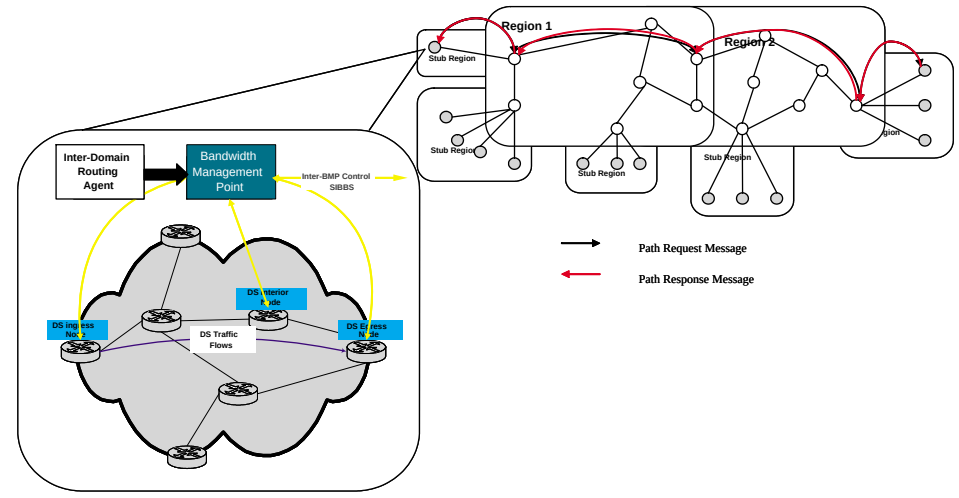


Transaction Management Protocol



- TMP works between end -hosts, between end -hosts and ISPs and between ISPs.
- End -host TMP communication is for charging negotiation. At this stage parties negotiate on the cost split.
- End -host ISP TMP communication is to notify the ISP which party is responsible for what part of the cost so that ISP can charge accordingly.
- ISP -Backbone communication is also for the same purpose
- TMP brings flexibility and variety to the internet -based businesses.

Region -Based Routing : Inter -Domain QoS Routing Protocol



BMP - GRID Integration