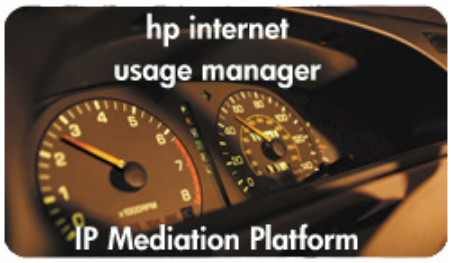


Background on the hp internet usage manager development program

May 2000

Hewlett-Packard in Usage Mediation

Hewlett-Packard's experience in billing mediation systems dates back approximately nine years. At that time, HP entered the mediation market of the circuit-switched voice network world. About three years ago, HP determined that with the emerging dominance of IP networks and the explosive growth of Internet services, it would be a short matter of time before IP usage metering would be required by the major service providers. HP's first deployment of IP usage mediation occurred with Telstra in Australia in mid-1997, long before it became a prominent market need.

That initial project was commercialized and released as HP Internet Usage Manager version 1.0. It featured a series of usage data collectors; a large, centralized database and a fixed output data record format for billing or other business support systems. Yet even as that was being released HP recognized that a centralized database architecture would never economically scale to the proportions required by large-scale service providers, and we began development of a completely new, fully distributed architecture that would endure for many years. That design was released in 1999 as HP Internet Usage Manager version 2.0, and has since been enhanced twice with versions 2.01 and 2.02.

Built for the Internet Age

HP's assessment of the critical success factors for Internet-age service providers produced the following conclusions:

1. Internet technology was moving so fast that any viable mediation solution would have to be extremely flexible to support new vendors and technologies, new services and hyper growth, or the service provider would be unable to remain competitive.

2. The volume of records to be processed would dwarf conventional norms from the circuit switched world, and data rates were growing exponentially. The mediation solution would have to scale not only in breadth, to operate across large, geographically dispersed networks, but also in performance to ensure that state-of-the-art routers and switches could be supported.

3. The corresponding size of the usage-metering infrastructure would require well-designed management features to simplify administration and ensure cost effective operation.

4. The value of a rich set of IP usage data goes well beyond billing applications alone, and a mediation platform should support a full range of applications in business intelligence, marketing and operations management.

These conclusions led to the following defining features of the current hp internet usage manager architecture:

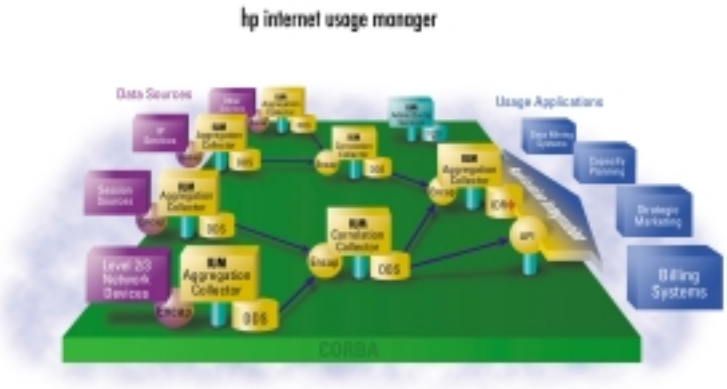
1. **Open, standards-based:** The key to keeping up with the Internet is to embrace industry standards such as CORBA and to provide open, documented interfaces to allow all equipment and application vendors, current and future, to contribute to the solution.

2. **Extensible:** HP Internet Usage Manager is written in 100% Java and operates today on HP-UX, NT and Solaris platforms, as well as Linux in our lab. Its plug-in architecture makes it easy for any developer to extend its functionality to add new features or incorporate new equipment and applications.

3. **Manageable:** Regardless of size, HP Internet Usage Manager can be remotely administered from a single server. It is also being increasingly well integrated with the full range of HP OpenView network management tools.

4. **Flexible:** Time to market and ability to accommodate changing conditions are critical to the success of an Internet service provider. The HP Internet Usage Manager development focus has been on general-purpose, configurable modules that can be easily adapted to quickly changing needs. A single aggregator rule engine can run multiple parallel aggregation schemes to support the differing needs of billing, marketing and operations management systems.

5. **Scalable:** Only a fully distributed architecture, including a distributed data store, will scale to meet the needs of the large service providers. Having already built HP Internet Usage Manager version 1.0 with a centralized architecture, HP understands this issue well. HP Internet Usage Manager 2.0 has already been deployed in large backbone-metering applications, as well as geographically dispersed networks.



The Right Priority

As potential customers conclude assessments of IP mediation alternatives, it is important to realize that the critical selection criterion for long-term success will be the underlying system architecture. Whether a specific device or application is supported at a particular point in time can be reduced to near-irrelevance if one possesses an open, flexible architecture to accommodate new requirements. But the reverse cannot be said – solving 50 or 100 small problems (device interfaces, for example) is of no value if the solution does not scale or if there is no flexibility to quickly adapt to changing requirements.HP Internet Usage Manager's open, distributed architecture is built to last, even as specific requirements evolve in Internet time.