



SYSTEM SCALABILITY AND PERFORMANCE OPTIMIZATION OF A MIDDLEWARE PLATFORM

CLIENT OVERVIEW

Our Client, an Enterprise ISV in Middleware Telecom products for Mobile Network Operators (MNOs) and provider of next-generation IP-based network and data services, enables operators to provide Internet services to their subscribers, with excellent rich media user experience and enhanced value added services. Our Client's other solutions include mobile data and video optimization technologies, Web acceleration, overall traffic management, and advanced revenue generating services. All of our Client's solutions are focused on delivering innovative mobile data services with optimal user experience, reducing network costs and complexity while leveraging existing infrastructure to generate new revenue.

KEY REQUIREMENTS

- Optimize the time consumed in creating heavy objects e.g. 100 site URLs and corresponding pattern and matcher objects
- Optimizing the request and the received response content which has irrelevant information and results in wasted processing time
- Disk I/O operation were taking considerable time
- Identifying and eliminating unnecessary database transactions- Reducing the response time of database hit and the number of transactions thereby improving TPS.
- Optimizing other validations which resulted into a few more bottlenecks like Queue Implementation and scale connection between different platforms

KEY CONTRIBUTIONS

- Eliminated the database transactions per request by modifying the flow to validate the master data for Services, Preferences, Language, Subscriber Type, etc. with the cache version.
- Enhanced the subscriber caching mechanism by eliminating execution of procedure to remove subscriber objects from cache using Guava APIs
- Object Optimization :
 - Created a single Pattern from the set of site URLs in case of multiple URLs
 - Modified Object Mapper and Datatype Factory objects to create a single instance of these objects so that it can be reused for all requests
- Asynchronous Behaviour and Bulk Processing :
 - Modified Injection API flow to update the counter information asynchronously which helped in saving, few milliseconds per request
 - Modified Subscriber API flow to insert/update subscriber information in database asynchronously
- Request and Response content :
 - Modified API response to reduce the content length of the response by eliminating the statistics and campaign information
- Disk I/O operation :
 - Eliminated writing of duplicate logs by modifying Application startup script

KEY BENEFITS

- Successfully scaled the system from 500 TPS to 5000 TPS for individual node
- System was able to support 25000 TPS with 5 nodes Increased the scalability of application beyond 500 TPS .
- Avoided application crashing with ~ 100 concurrent connections.
- Resolved the issue where the application SDRs stopped writing abruptly.
- Efficiency of targeted real-time distribution of carrier promotions, content and advertising on Smartphones and Tablets by the MNOs improved by more than 30%.

- Eliminating unnecessary Database Transactions :
 - Modified the flow to use parameter from cache for every Injection API which helped in eliminating extra database transactions
 - Cached the user information and for each Subscriber API request, implementation validated the user information in the request with the cache to eliminate database call for user validation per subscriber

TECHNOLOGY STACK

- Frame Work: Struts Hibernate, Spring (Core, Boot, Data, Web Services)
- Web Technologies: JSTL, JSON, XML, XSD, JavaScript, HTML, CSS
- J2EE Technology: JSP, Servlet, Batch
- Languages: Java (1.6 and 1.7), Shell Scripting
- Database: Oracle
- Development Tools: IntelliJ Idea, NetBeans, Eclipse (STS), Cygwin, SSH, JMeter,
- Sonar, Chrome Dev Tools, HeidiSQL Client
- SCM Tools: Subversion, Tortoise SVN, Git, GithubTesting T Junit, JMeter, Soap UI, Burp Suite



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