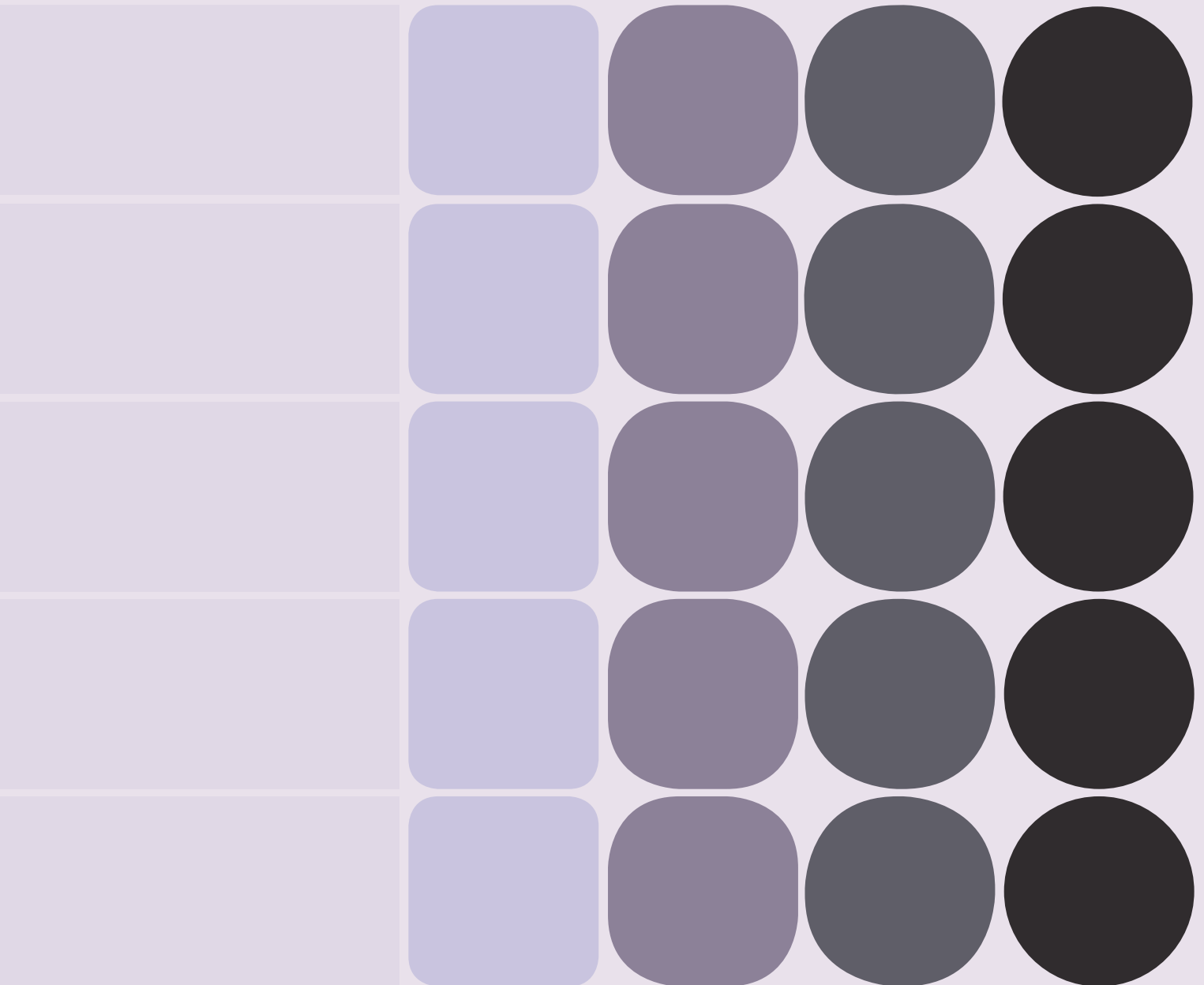


Secure rapid response time under the Cloud Auto Scaling environment through real-time

Written by Yohan, Yun,
Classting developer

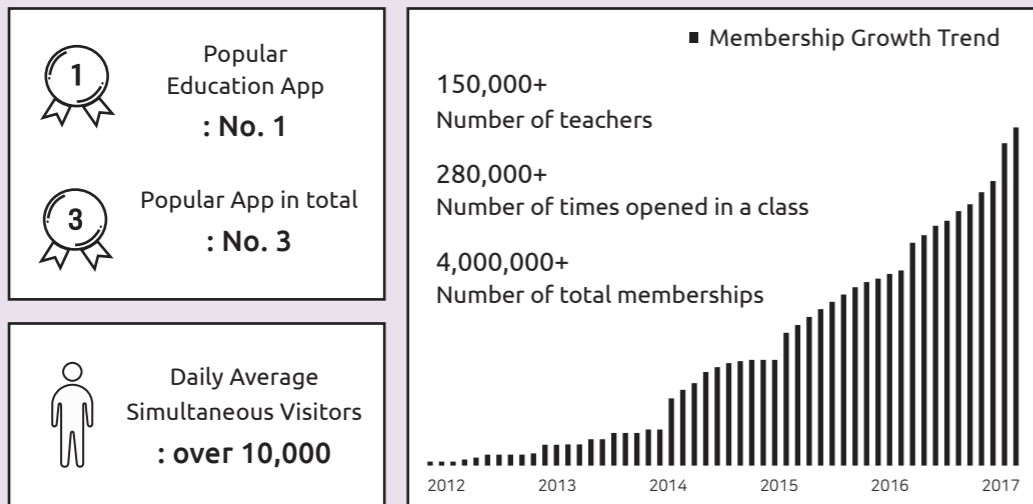
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About Classting

Industry:
Education Platform

Key Performance Indicators:



Classting aims to make school a better place, and it is available as a mobile app (Android or iOS) and as a web application.

-As of March 2017, it was ranked no. 1 as the most downloaded app on Google Play for education

-As of June 2017, the total number of users reached over 4,000,000, the number of teachers

-Daily Average Simultaneous Visitors were more than 10,000 at the peak (recorded between 14:00 and 15:00 by Google Analytics.)

Starting date of using the product

September 2015

What were you monitoring?

We monitored our PHP server.

Why JENNIFER? :

Classting uses logs provided by Nginx and AWStats, install-based monitoring tools, to identify the amount of traffic requested by a server. It also tracks the amount of traffic by using an internal log collection tool from Google Analytics, and Crashlytics, an app crash collection tool. These methods help to identify the total amount of traffic per month/date; however, they are not suitable to determine the amount of traffic requested by a server at every moment. In particular, Google Analytics allows managers to learn basic information such as the number of users in real-time, however, it cannot identify the cause of service errors. For instance, it does not show you which part caused a bottleneck, or which part triggered an error.

While using JENNIFER over time, I noticed that JENNIFER is very efficient in that it allows users to monitor information you need to fix most service errors in one place. Among others, JENNIFER's real-time monitoring helped to enhance the response time since we could fix errors more efficiently when we could identify the various causes of errors. My ability to manage my work was improved by the introduction of this software.

What are the major improvements? :

JENNIFER helps managers easily find an error that occurred at the server API. Especially, it clearly shows the class related with the cause of a problem and the function. In addition, JENNIFER enhanced the response time toward traffic that occurs in a flash. Major improvements are described below:

① Every time an error occurred at Classting, an administrator had to access its console to review the system logging, CPU usage, and memory usage. Meanwhile JENNIFER is an efficient tool in a sense that it allows the administrator to monitor necessary information for fixing the problem at hand. In addition, it identifies the mobile app client that was struggling due to the failure of collecting logs.

② Auto Scaling on AWS controls the number of servers (depending on the usage) and AWS CloudWatch continues to check to see if Auto scaling is in a normal condition. Due to the nature of this service, there can be large amounts of traffic at one time. It was difficult to manage such amount of traffic with AWS CloudWatch as it reports one or two minutes later, it does not report real-time data. Thanks to the real-time reporting of JENNIFER, we were able to respond to errors in a timelier manner.

Classting's monitoring service :

Amazon Web Service (AWS) has been used to run the Classting services and the number of its servers changes depending on the level of usage. JENNIFER identifies the number of on-going servers, the status of each server, operating condition, and response time on request.

Details about using JENNIFER and how JENNIFER fixed the problem:

The characteristic of Classting is quite similar to that of any other Social Network Service. For this reason, it uses general RDB and No-SQL DB. It also uses Dynamo DB in the newsfeed and post functions. Dynamo DB users need to have write/read capacity and its cost is calculated based on the number of users required.



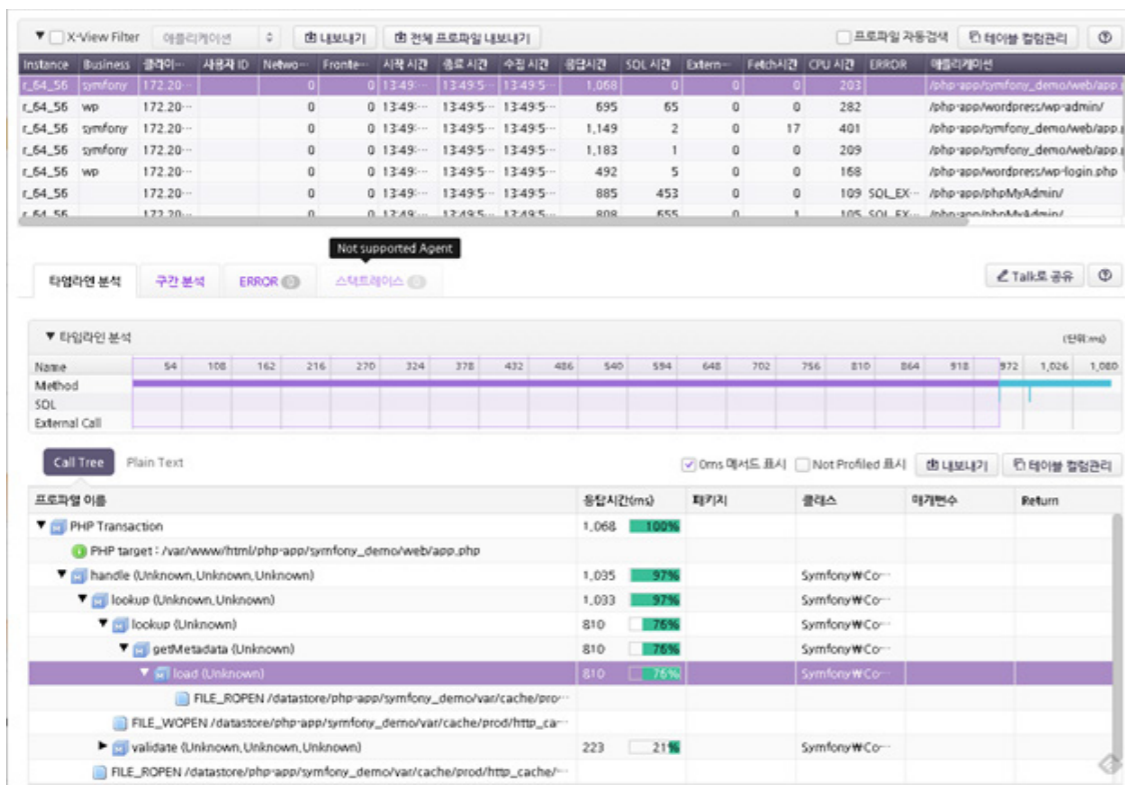
[Classting Monitoring Display]

Write/Read capacity should be controlled automatically depending on the level of usage in order to lower the overall service cost. AWS provides an auto-scaling feature through CloudWatch. Most active users, however, access CloudWatch through a mobile alert. While the usage of active users changes quickly, CloudWatch applies the change slower than the actual change speed.

As a result, when several mobile alerts occur, Dynamo DB write/read capacity is occasionally insufficient. Ultimately the processing time of the service becomes slow. In order to fix this problem, an administrator needs to increase the level of write/read capacity manually, however, it was difficult to detect these issues in real-time with the existing monitoring tools. Thanks to the real-time monitoring of JENNIFER, the administrator now is able to respond more quickly.

① Check the method call where response time is slow using Dynamic Profile

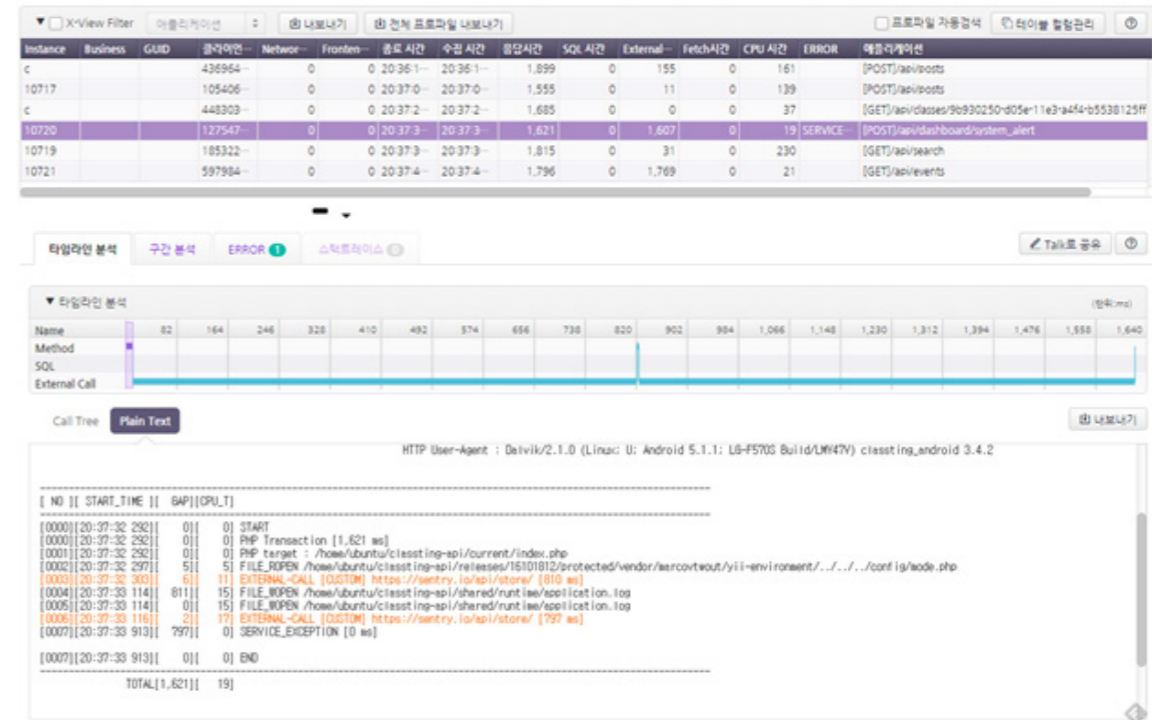
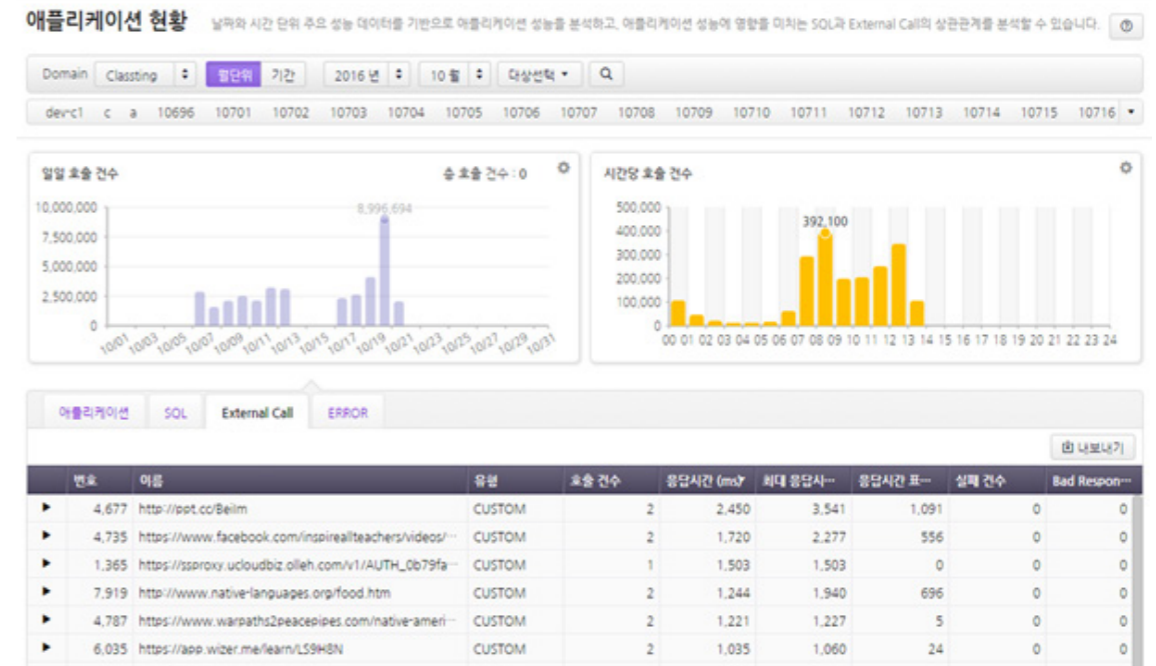
In general, a response is quickly made to manage a server request. However, I noticed an issue that was not handled for a long time. When I examined the problem through Dynamic Profile, it turned out that the problem was not caused by the server program. The response had been delayed at the DB. On top of this, I used JENNIFER to profile the classes that appeared to be the cause of the errors. I was able to fix the problem by finding which part of the DB request caused the delay, and then identify the method call and function factors that caused the problem.



[Figure ① : Check the method call when response time is slow through Dynamic Profile]

② Identify an external service call delay

Classting provides various services with multiple frameworks and it is implemented by PHP. JENNIFER easily fixed the problem that occurred when linking with other services located inside the Classting. Using only the Classting server requests it was difficult to judge whether the cause of slow response time is associated with PHP or other services in Classting. Using JENNIFER, I confirmed that the other services caused the problem, not the PHP server.



[Figure ② :Identify external service call delay]

③ Identify and fix the Segmentation Fault that occurs at the PHP external extension

When updating the Classting server, a certain request failed to return a result value to users. After confirming the problem through the error detailed screen of JENNIFER, I noticed that the cause of the problem resulted from a PHP external extension module. I was able to fix the problem by reinstalling the existing module with another version.

④ Set read/write threshold of AWS Dynamo DB through Performance Browser

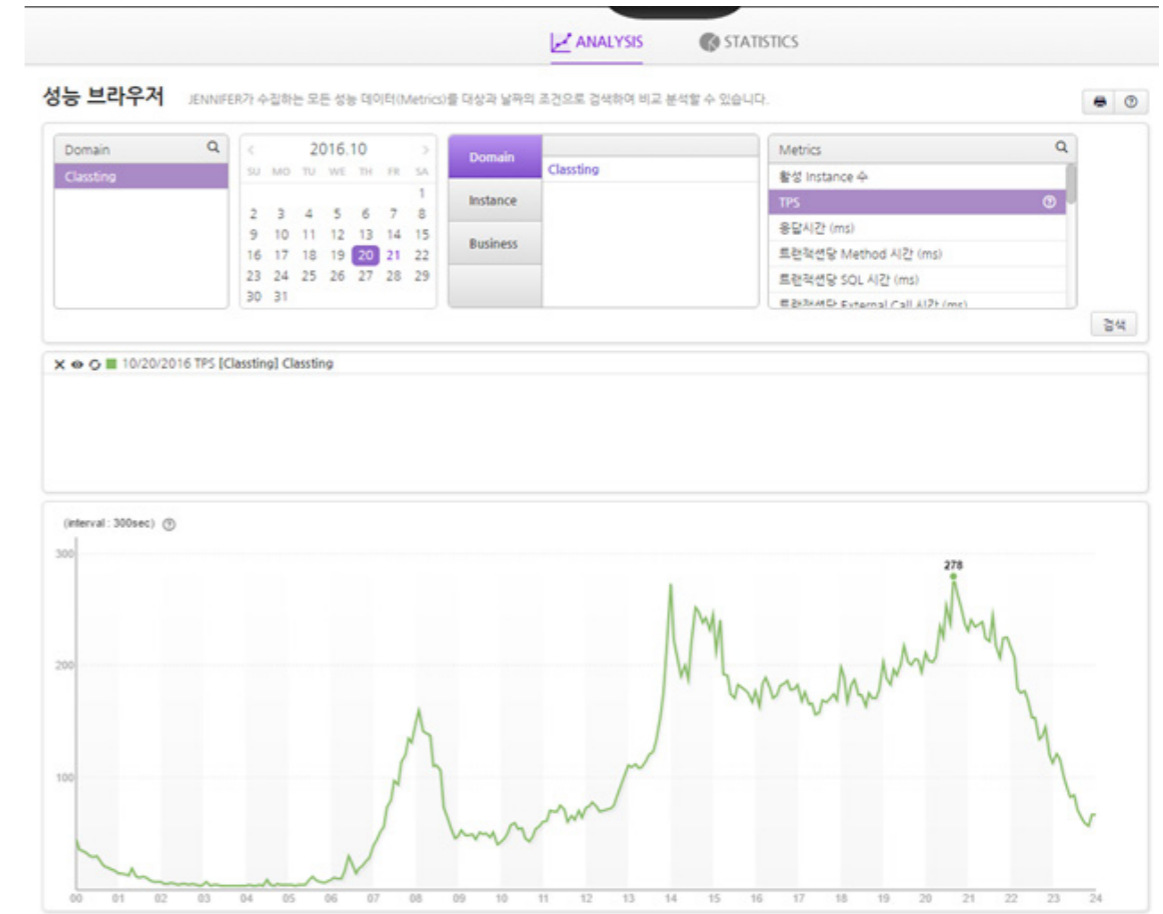
While Classting uses multiple AWS services, it was necessary to identify the proper level of the threshold for the read/write of Dynamo DB service. (AWS Dynamo now provides auto-scaling service.) Users need to apply different service capacity per hour so as to efficiently set up and manage the product. The TPS Metric graph of the JENNIFER performance browser can be used to apply a suitable value. I was able to apply the proper threshold value while monitoring TPS per hour.

⑤ Use real-time monitoring

Given that Classting controls the number of its servers by using Auto Scaling, it must always manage the servers in real-time. The JENNIFER dashboard is quite efficient as it shows the usage of server resources (CPU and memory), any bottlenecks, and TPS at once. Classting continues to conduct monitoring.

EVENT 유형	심각도	메세지	값	트랜잭션
NATIVE_CRITICAL_ERROR	FATAL	[더보기] Undefined Error : Seg...		보기
NATIVE_CRITICAL_ERROR	FATAL	[더보기] Undefined Error : Seg...		보기

[Figure ③ : Identify and fix the Segmentation Fault that occurs at PHP external extension]



[Figure ④ : Performance Browser]



[Figure ⑤ : Classting Real-Time Monitoring Dashboard]

How to use JENNIFER:



Name of interviewee:

Yohan, Yun,
Classting Developer

Merits of JENNIFER are summarized as follows:

- It is useful to fix problems related to linking external services.
- It can provide general information without collecting logs.
- It allows users to check their service use through performance browser.
- It shows you the number of visitors on a server in real-time.
- It allows users to review the sever traffic at a glance which aids with determining if an increase in the number of servers is needed.

Monitoring relevant information at once to fix service errors is very useful. Since other monitoring tools are not able to do this in real-time. It is also effective for increasing the number of services or events. Classting will continue to use JENNIFER.



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