Queueing Model For StubHub

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1. Which Model to Use

1.1. Single Station M/M/m Model

Take SPA role as an example.

- We may consider the simple service like SPA as a M/M/m model.
- It corresponds to the **qsmmm** function in Octave queueing package. The reason is that we can regard SPA Role as a black box, it accepts requests of the same one class and gives the output.

Required input

1. Arrival Rate lambda: Get from Splunk or other platform.
2. Service Rate mu: Get data from Splunk or other platform.
3. m: m means the number of servers. It's more proper to regard m as the maximum number of requests the server can deal with at the same time.

1.2. Single Class Open Queueing Network

Take POD1 as an example.

- According to us, POD1 is very suitable for Single Class Open Queueing Network.
- It corresponds to the **qnos** function in Octave. Each role is regarded as one service center.
- There's a condition for using this model, we must consider the request for one specific role is of the same class.

Required input

1. Arrival Rate to each role.
2. Routing matrix for these roles. If no routing happens, just assign 0 to it.
3. The service rate for each role. And the maximum capacity of each role.

1.3. Multiple Class Open Queueing Network

Take POD1 as an example.

- If for each role, there are different type of requests. We need one more dimension for class C.
- It corresponds to the **qnom** function in Octave.

Required input
Similar to single class situation, all add one dimension.

2. Project Plan for Recent

Basically the same as the document we received.

We may start from SPA role.

1. Learn to use the prototype of Octave queueing package. *Finished.*
2. Develop a simulation tool for these queueing models. *Working on it.*
3. Data gathering from Splunk or ExtraHop. *Need Support.*

- make sure the arriving fits the Poisson distribution.
- get the arriving rate
- check if the service time fits the exponential distribution.
- get the serving rate
- test the capacity of SPA server. This may be done on POD31.

4. Use the data gathered to determine if the prototype and simulation tool are successful.
5. Extend the project to the whole POD.