How to protect back-end servers from DoS attack using NetScaler AppQoE feature?

Use Case

How to protect back-end servers from DoS (Denial-of-Service) attack using NetScaler AppQoE feature.

Introduction

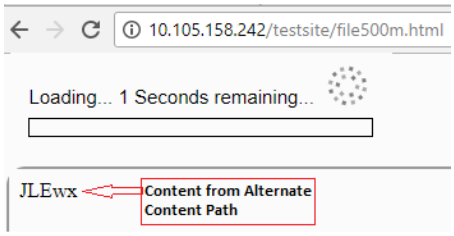
Application level Quality of Experience (AppQoE) helps control allocation of resources based on prioritization along with DoS protection for back-end resources. Using the AppQoE you can accomplish following benefits: -

- Prioritization of incoming request,
- Maintain priority order across multiple connections,
- DoS protection at application layer by sending DoS challenges with JavaScript to validate client,
- Providing alternate or build-in response to keep client busy,
- Serve the content from custom response file on NetScaler.

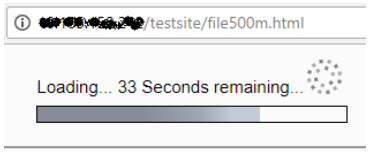
AppQoE Parameters details:

Description for AppQoE action fields;

- Action Type – NetScaler ADC will perform any one of the following responder action:
    I. ACS – Serves the content from Alternate Content Server specified in 'Alternate Content Server Name' (e.g. ex_server1) once 'Maximum connections' (e.g. 500) or 'Delay' threshold is reached. ACS action type will provide temporary web page till requested resources are not available. See below screenshot for alternate web page;

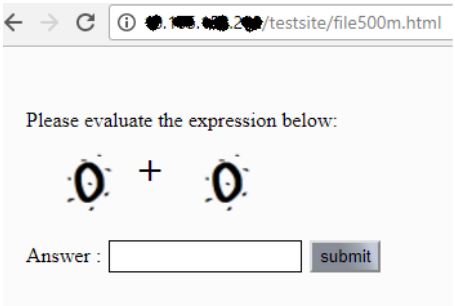


    II. NS – Built-in NetScaler ADC response provided when 'Maximum connections' or 'Delay' threshold is reached. NS action type will provide built-in temporary web page till requested resources are not available. See below screenshot for alternate web page;

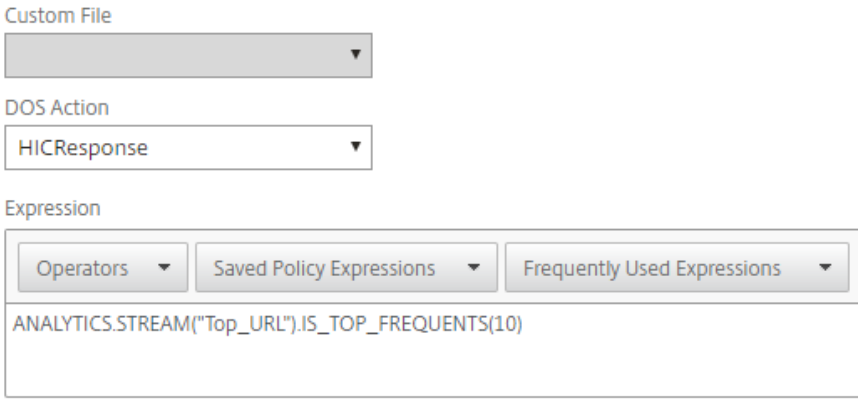


III. NONE – No alternate content is provided; new connections will wait till back-end resources are ready to serve new content. It is mandate to select Priority field for Action Type as NONE.

- Priority – specifies the order in which waiting requests are to be fulfilled when resources are available. It has various options such as HIGH, MEDIUM, LOW or LOWEST. If priority is not configured, default priority choice set to LOWEST.
- Policy Queue Depth – When the policy queue size (number of requests queued for the policy binding this action is attached to) increases to the specified threshold, subsequent requests are dropped to the lowest priority level.
- Queue Depth – Threshold value for specified priority (HIGH | MEDIUM | LOW). After reaching threshold value subsequent request assigned to LOWEST priority queue.
- DOS Action (SimpleResponse | HICResponse) – When DOS attack threshold is reached, DOS action will be triggered. For authenticity of the incoming requests, NetScaler ADC will send HTTP challenges to client machine. A client machine capable of computing the original value is considered genuine.
    - In SimpleResponse, challenge is sent to client machine in the form of cookies and genuine client machine will respond back to the cookies without human intervention. (e.g. NetScaler will send 4+3=? Challenge in _DOSH body cookie where client machine computes the value for this cookie and respond back with the final value).
    - In HICResponse, NetScaler will send the challenge in the form of image where human intervention is required to solve the challenge. (e.g. NetScaler will send 2+6= ? challenge to client machine where human will calculate the value and submit it for authenticity). For more details, refer following screenshot:



    - For SimpleResponse or HICResponse DoS action option, you can add an optional second-level check in expression box.



IV. TCP profile – It is, an option field, collection of TCP settings that can be bound to AppQoE policy. Static TCP profiles are bound at load balancing virtual server level but for few use cases (for e.g. Telco 3G /4G users) we need to configure TCP settings dynamically. In such scenarios, we can configure TCP profile and bind it to AppQoE policy. For TCP profile configuration, click on: - https://support.citrix.com/article/CTX130962

How to configure AppQoE feature on NetScaler appliance:

1. Enable AppQoE feature on NetScaler

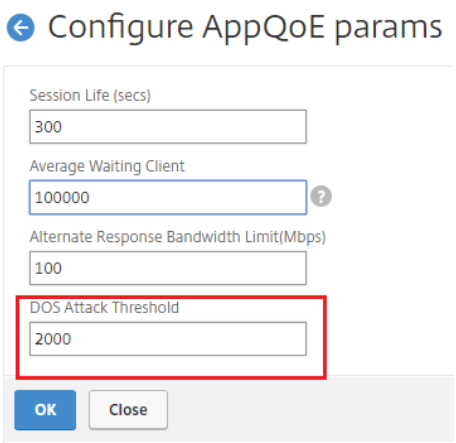
At the command prompt, type the following commands:

- enable ns feature appqoe
- show ns feature

From configuration utility interface, perform following steps:

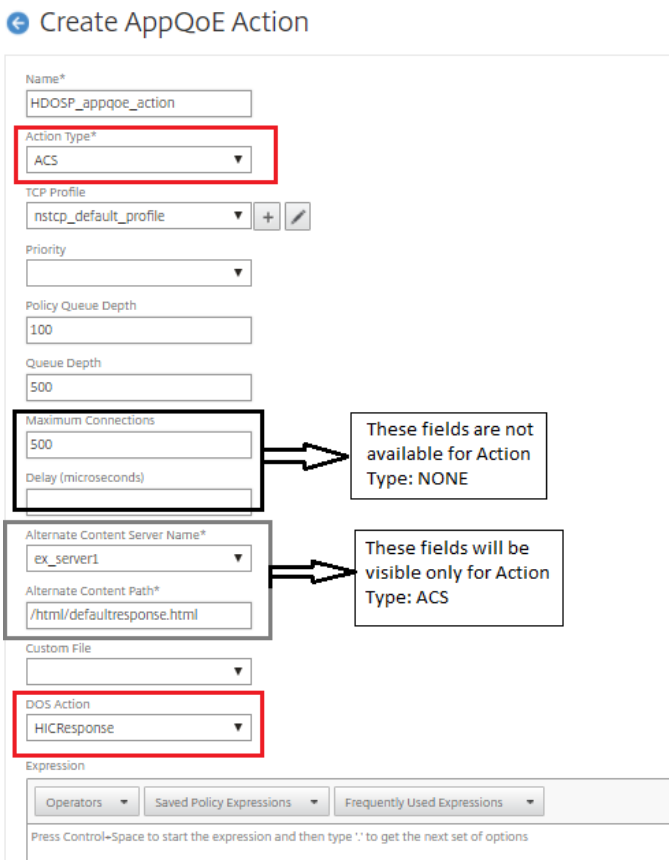
- Navigate to System > Settings.
- In the details pane, click Configure Advanced Features.
- In the Configure Advanced Features dialog box, select the AppQoE check box.
- Click OK.

2. Configure AppQoE parameters.



DOS Attack Threshold field describes the number of connections that must be waiting in queues before the ADC responds with DoS protection measures.

3. Configure AppQoE action.



Action Type values can be: ACS, NS or NONE.

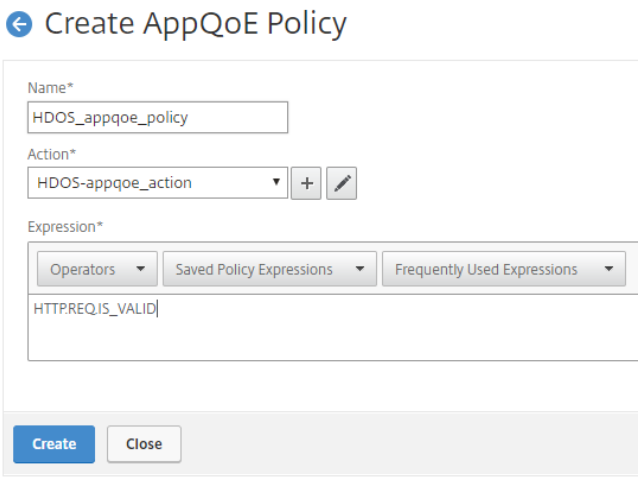
DOS Action values can be: NONE, SimpleResponse or HICResponse

For Action Type (NS | ACS), its mandate to set either Maximum connections or Delay field.

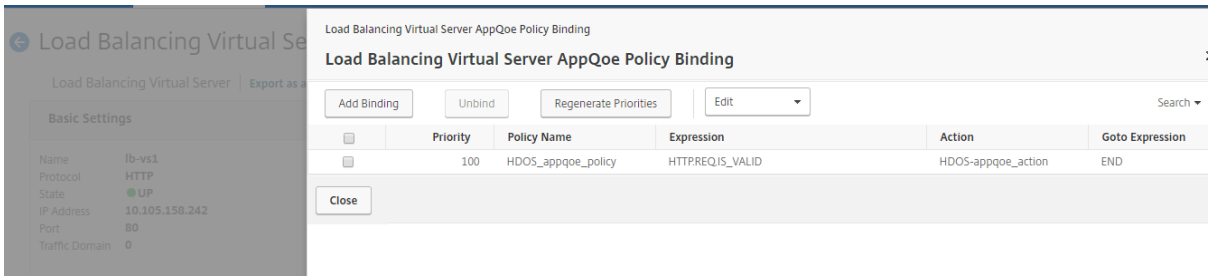
Expression box will only be present for DOS Action (SimpleResponse | HICResponse).

Option to set Alternate Content Server Name and Alternate Content Path will only be available for Action Type – ACS.

4. Configure AppQoE policy and bind AppQoE action to it.



5. Bind AppQoE policy to Load balancing virtual server.



So, NetScaler AppQoE feature provides various advantages like priority queuing, SureConnect and DoS protection to protect the back-end resources against the attack.