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Quality of Security Service (QoSS) Demo

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Configuring the Quality of Security Service Costing Demo
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These instructions describe how to set up a QoSS Demo which provides FTP and Secure Web Browser service tasks. See the QoSS directions for information on how to run the QoSS Demo.

First, define the valid modes and security levels to be available by creating configuration file QoSS.properties. The following configuration file defines the modes and levels as shown, and also identifies the directory where the task definitions will be stored:

- levels=low medium high
- modes=Normal Impacted Emergency
- taskdirectory=tasks

This QoSS configuration defines costing for two tasks, FTP and Secure Web Browser. Each task provides a set of services. Each service utilizes one or more service attributes. Each service attribute can incur a cost on one or more resources. Six costs are defined for startup and streaming for CPU usage, memory usage, and Ethernet bandwidth (Costs are defined in file Formulas.java, services in Services.java, and attributes in Attributes.java).

A unique formula must exist for every cost and service attribute. This demo defines two tasks, one with two services and one with three, totaling five services. Since there are six costs, a total of thirty formulas must be defined. Define all formulas for all the task's services: click on Define Task. Type in the task name, then click on the desired services and variable service attributes. Then click on each formula box, in turn, to enter each formula. Enter service attributes by clicking on them. Do not type them manually.

Formulas:

Task: FTP
Service: Integrity on Network Wire
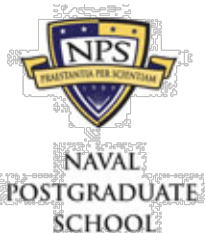Variable Service Attributes: Symmetric Key Length, Packet Integrity Rate
Service Cost Formulas:

CPU Start	5000 + 10 * Symmetric Key Length
CPU Streaming	40 * Packet Integrity Rate
Memory Start	6144 + Symmetric Key Length
Memory Streaming	5120 + Symmetric Key Length
Bandwidth Start	0
Bandwidth Streaming	8 * Packet Integrity Rate

Service: Authenticity on End System
Variable Service Attributes: Client Authentication
Service Cost Formulas:

CPU Start	200 * Client Authentication + 1000
CPU Streaming	0
Memory Start	2048 * Client Authentication + 67584
Memory Streaming	0
Bandwidth Start	100
Bandwidth Streaming	0

Task: Secure Web Browser
Service: Confidentiality on Network Wire
Variable Service Attributes: Symmetric Encryption Algorithm, Symmetric Key Length
Service Cost Formulas:

CPU Start	Symmetric Encryption Algorithm * 30000 + 100 * Symmetric Key Length
CPU Streaming	Symmetric Encryption Algorithm * 512 + 8 * Symmetric Key Length
Memory Start	Symmetric Encryption Algorithm * 8500 + 100 * Symmetric Key Length
Memory Streaming	Symmetric Encryption Algorithm * 6500 + 100 * Symmetric Key Length
Bandwidth Start	0
Bandwidth Streaming	Symmetric Encryption Algorithm * 2

Service: Integrity on Network Wire
Variable Service Attributes: Authentication Algorithm, Authentication Key Length, Packet Integrity Rate,
Symmetric Key Length
Service Cost Formulas:

CPU Start	Authentication Algorithm * (5000 + 10 * Authentication Key Length)
CPU Streaming	Authentication Algorithm * (40 * Packet Integrity Rate)
Memory Start	Authentication Algorithm * (6144 + Symmetric Key Length)
Memory Streaming	Authentication Algorithm * (5120 + Symmetric Key Length)
Bandwidth Start	0
Bandwidth Streaming	Authentication Algorithm * (8 * Packet Integrity Rate)

Service: Authenticity on End System
Variable Service Attributes:Client Authentication, Server Authentication Key Length
Service Cost Formulas:

CPU Start	200 * Client Authentication + 4000 + 10 * Server Authentication Key Length
CPU Streaming	0

Memory Start	$2048 *$ Client Authentication $+ 77584 + 5 *$ Server Authentication Key Length
Memory Streaming	0
Bandwidth Start	$612 +$ Server Authentication Key Length
Bandwidth Streaming	0

Lastly, range settings are defined. Each task has its own policy for acceptable ranges in which its service attributes can operate. These settings are restrained by mode. Actual valid settings are further restrained by the active security level within the active mode. The actual value for a service attribute must fall within the range allowable for the mode and level. Define the mode bound and level bound range settings for the FTP and Secure Web Browser:

Mode Bounds for FTP:

FTP	Normal	Impacted	Emergency
Packet Integrity Rate	.6-1	.2-.6	1
Symmetric Key Length	56-128	56	128
Client Authentication	0-1	0-1	1-2

Level Bounds for FTP:

FTP	Normal			Impacted			Emergency		
	Low	Med	High	Low	Med	High	Low	Med	High
Packet Integrity Rate	.6-.8	.8-.99	1	.2-.4	.4-.6	.6	1	1	1
Symmetric Key Length	56-96	96-128	128	56	56	56	128	128	128
Client Authentication	0	1	1	0	0	1	1	2	2

Mode Bounds for Secure Web Browser:

Secure Web Browser	Normal	Impacted	Emergency
Packet Integrity Rate	0-1	0-1	0-1

Symmetric Key Length	56-128	56	128
Authentication Key Length	0-256	0-96	56-256
Server Authentication Key Length	0-1024	0-1024	512-1024
Client Authentication	0-4	0-3	1-4
Symmetric Encryption Algorithm	0-8	0-3	0-3
Authentication Algorithm	0-4	0-3	1-4

Level Bounds for Secure Web Browser:

Secure Web Browser	Normal			Impacted			Emergency		
	Low	Med	High	Low	Med	High	Low	Med	High
Packet Integrity Rate	1	1	1	0	1	1	1	1	1
Symmetric Key Length	56	96	128	56	56	56	128	128	128
Authentication Key Length	0-256	56-256	96-256	0-96	56-96	96	56-256	96-256	256
Server Authentication Key Length	512	768	1024	0	512	768	768	1024	1024
Client Authentication	0-4	1-4	2-4	0-3	1-3	2-3	1	1	1
Symmetric Encryption Algorithm	0-8	1-8	1-8	0-3	1-3	1-3	0-8	1-8	1-8

Authentication Algorithm	0-4	0-4	0-4	0-3	0-3	0-3	1-4	1-4	1-4

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