BIG-IP® System: External Cryptographic Server Offload Implementation

Version 11.6

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Chapter 1

Implementing External Cryptographic Server Offload with BIG-IP systems

Overview: Implementing external cryptographic server offload

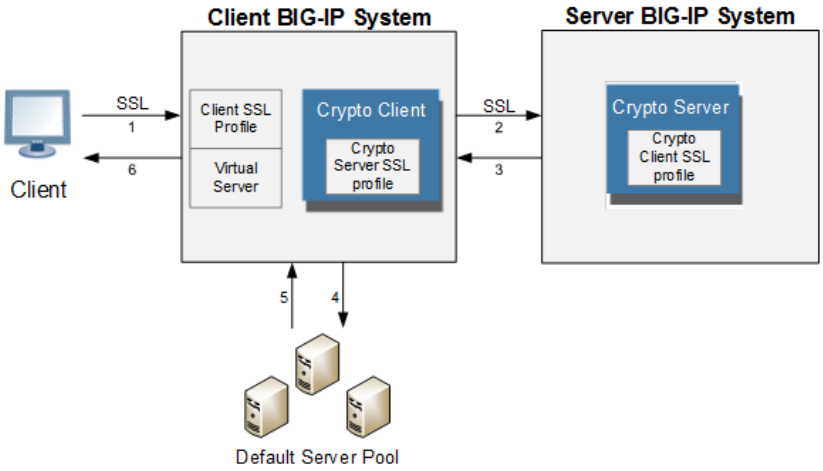
You can offload cryptographic operations to an external BIG-IP® system. For example, you can set up an LTM VE instance (the crypto client) to offload cryptographic operations, such as an RSA decryption operation for an SSL handshake, to an external BIG-IP system (the crypto server) that supports crypographic hardware acceleration.

In general, the setup process includes configuring a client BIG-IP system as a crypto client and a server BIG-IP system as a crypto server, and ensures secure communication between the end user, the crypto client, and the crypto server.

Important: *Both the crypto client and crypto server must be running BIG-IP software version 11.6.0 or later.*

Important: *Before you perform the tasks in this implementation, verify that each BIG-IP system has the default device certificate,* `default.crt`*, installed on it. For more information about device certificates, see BIG-IP® Digital Certificates: Administration.*

This illustration depicts an external cryptographic offload configuration.



The illustration shows the BIG-IP configuration objects that are required for implementing the external cryptographic server offload feature, as well as the flow of client traffic that occurs. In the illustration, one BIG-IP system includes a virtual server configured with the destination IP address for application traffic coming from a client system. Because the client traffic uses SSL, the BIG-IP system with the virtual server must include a standard Client SSL profile, which causes cryptographic functions to be offloaded from the selected destination server (pool member) to that BIG-IP system.

Once this BIG-IP system has assumed cryptographic functions from the destination server, the BIG-IP system can offload these functions to another BIG-IP system to handle the actual cryptographic processing. To enable the BIG-IP system to offload the cryptographic processing to another BIG-IP system, you must designate the two BIG-IP systems as a crypto client and crypto server, and you must create an SSL profile on each system that is optimized for BIG-IP-to-BIG-IP cryptographic processing (a crypto-optimized Server SSL profile for the BIG-IP crypto client and crypto-optimized Client SSL profile for the BIG-IP crypto server).

Task summary

Creating a Client SSL profile on a client BIG-IP system
Creating a pool on a client BIG-IP system

Creating a Client SSL profile on a client BIG-IP system

You create a Client SSL profile on a client BIG-IP® system to authenticate and decrypt/encrypt client-side application traffic.

1. On the Main tab, click **Local Traffic** > **Profiles** > **SSL** > **Client**.
   The Client profile list screen opens.
2. Click **Create**.
   The New Client SSL Profile screen opens.
3. Configure all profile settings as needed.
4. Click **Finished**.

After you create the Client SSL profile, you assign the profile to a virtual server. The BIG-IP® system can apply SSL security to the type of application traffic for which the virtual server is configured to listen.

Creating a pool on a client BIG-IP system

You can create a pool of servers on a client BIG-IP® system that you can group together to receive and process traffic.

1. On the Main tab, click **Local Traffic** > **Pools**.
   The Pool List screen opens.
2. Click **Create**.
   The New Pool screen opens.
3. In the **Name** field, type a unique name for the pool.
4. Using the **New Members** setting, add each resource that you want to include in the pool:
   a) In the **Node Name** field, type a name for the node portion of the pool member.
      This step is optional.
   b) In the **Address** field, type an IP address.
   c) In the **Service Port** field, type a port number, or select a service name from the list.
   d) In the **Priority** field, type a priority number.
      This step is optional.
   e) Click **Add**.
5. Click **Finished**.

Creating a virtual server on a client BIG-IP system

A virtual server represents a destination IP address for application traffic on a client BIG-IP® system.

1. On the Main tab, click **Local Traffic** > **Virtual Servers**.
   The Virtual Server List screen opens.
2. Click the **Create** button.
   The New Virtual Server screen opens.
3. In the **Name** field, type a unique name for the virtual server.
4. In the **Destination Address** field, type the IP address in CIDR format.

   The supported format is address/prefix, where the prefix length is in bits. For example, an IPv4 address/prefix is `10.0.0.1` or `10.0.0.0/24`, and an IPv6 address/prefix is `ffe1::0020/64` or `2001:ed8:77b5:2:10:10:100:42/64`. When you use an IPv4 address without specifying a prefix, the BIG-IP® system automatically uses a `/32` prefix.
5. In the **Service Port** field, type a port number or select a service name from the **Service Port** list.
6. In the Resources area of the screen, from the **Default Pool** list, select the relevant pool name.
7. For the **SSL Profile (Client)** setting, from the **Available** list, select the name of the Client SSL profile you previously created, and using the Move button, move the name to the **Selected** list.

Creating a Server SSL profile on a client BIG-IP system

With a Server SSL profile, a client BIG-IP® system can perform decryption and encryption for server-side SSL traffic.

1. On the Main tab, click **Local Traffic** > **Profiles** > **SSL** > **Server**.
   The SSL Server profile list screen opens.
2. Click **Create**.
   The New Server SSL Profile screen opens.
3. In the **Name** field, type a unique name for the profile.
4. Select **crypto-client-default-serverssl** in the **Parent Profile** list.
5. Modify the settings, as required.
6. Click **Finished**.

Creating a crypto client object on a client BIG-IP system

You can create a crypto client object to enable a BIG-IP® system to act as a crypto client for external cryptographic server offload.

1. On the Main tab, click **System** > **Crypto Offloading** > **Crypto Client**.
   The Crypto Client screen displays a list of crypto clients configured on the system.
2. Click **Create**.
3. In the **Name** field, type a unique name for the crypto client object.
4. In the **Address** field, type the IP address of the crypto server that you want to use for the crypto server object.
5. In the **Service Port** field, type a port number, or select a service name from the list.
6. In the **TCP Profiles** field, select **tcp**.
7. For the **SSL Profiles** setting, select the Server SSL profile that you previously created.

Creating a Client SSL profile on a server BIG-IP system

You create a Client SSL profile on a server BIG-IP® system to authenticate and decrypt/encrypt application traffic from the client BIG-IP system.

1. On the Main tab, click **Local Traffic** > **Profiles** > **SSL** > **Client**.
   The Client profile list screen opens.
2. Click **Create**.
   The New Client SSL Profile screen opens.
3. Select **crypto-server-default-clientssl** in the **Parent Profile** list.
4. Configure all profile settings as needed.
5. Click **Finished**.

Creating a crypto server object on a server BIG-IP system

You can create a crypto server object to enable your BIG-IP® system to act as a crypto server for external cryptographic server offload.

1. On the Main tab, click **System** > **Crypto Offloading** > **Crypto Server**.
   The Crypto Server screen displays a list of crypto servers configured on the system.
2. Click **Create**.
3. In the **Name** field, type a unique name for the crypto server object.
4. In the **Address** field, type the IP address you want to use for the crypto server object.
5. In the **Service Port** field, type a port number, or select a service name from the list.
6. In the **TCP Profiles** field, select **tcp**.
7. For the **SSL Profiles** setting, select the Client SSL profile that you previously created.
8. (Optional) Using the **Crypto Client List** setting, add the crypto clients that can access the crypto server:
   a) In the **Address** field, type a crypto client self IP address.
   b) Click **Add**.

Verifying the crypto client and crypto server

After the client and server BIG-IP® systems have processed traffic, you can use `tmsh` to verify that the crypto client and crypto server systems are functioning properly.

1. Open the Traffic Management Shell (`tmsh`).
   ```
   tmsh
   ```
2. Verify that the crypto client is functioning.
   ```
   show sys crypto client <crypto_client_name>
   ```
   A summary similar to this example displays:

```
--------------------------
Sys::Crypto Client: crypto_client_name
--------------------------
  Received Packets      2
  Received Bytes       48
```

```
  Transmitted Packets   2
  Transmitted Bytes    40
```

3. Verify that the crypto server is functioning.

   ```
   show sys crypto server <crypto_server_name>
   ```

   A summary similar to this example displays:

```
-------------------------
Sys::Crypto Server: crypto_server_name
-------------------------
  Received Packets      2
  Received Bytes       40
  Transmitted Packets   2
  Transmitted Bytes    48
```

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