Deployment Guide
Document version 2.1

Deploying the BIG-IP LTM with IBM Lotus iNotes

Welcome to the F5 and IBM Lotus iNotes deployment guide. This guide shows you how to configure the BIG-IP Local Traffic Manager (LTM) for a highly available and easily scalable iNotes deployment. The BIG-IP LTM provides users with a seamless failover experience. The user never realizes if the original server with which they were interacting is no longer available; rather, the BIG-IP seamlessly detects any failure and sends the request on to an available server.

IBM® Lotus® iNotes 8.5 software provides a security-rich messaging and collaboration platform for sharing data, connecting your employees and extended communities. It provides a Web browser alternative for accessing IBM Lotus Domino applications, including email calendar, and personal information management (PIM) capabilities, as well as instant messaging and presence awareness.

For more information on iNotes, see: *http://www-01.ibm.com/software/lotus/products/inotes/*

For more information on the F5 BIG-IP system, see *http://www.f5.com/products/big-ip*

To provide feedback on this deployment guide or other F5 solution documents, contact us at *solutionsfeedback@f5.com*.

Products and versions tested

Product	Version
BIG-IP LTM	10.0.1, 10.1, 11.2, 11.3
IBM Lotus iNotes	8.5 (applies to 8.5.1)

Important: *Make sure you are using the most recent version of this deployment guide, found at http://www.f5.com/pdf/deployment-guides/f5-ibm-inotes-dg.pdf.*

Prerequisites and configuration notes

The following are prerequisites and configuration notes for this deployment.

➤ You must have a working deployment of IBM Lotus Domino 8.5 Email Service, and Lotus Notes 8.5 with the iNotes Web client option installed.

➤ The BIG-IP LTM must be running version 10.0.1 or later.

➤ _**Critical:**_ You must read and follow the instructions found in the following IBM link in order to use the solution presented in this guide:
http://www.ibm.com/developerworks/lotus/library/inotes-avail/index.html

➤ For more information on the iNotes configuration, see the IBM Redbook:
http://www.redbooks.ibm.com/redbooks/pdfs/sg246518.pdf

➤ For optional procedures for configuring a highly available iNotes implementation with the BIG-IP system, after completing the base configuration, see _Appendix: Optional configuration for highly available implementations on page 4._

Configuration example

The following is a sample network architecture depicting the BIG-IP managing traffic to the iNotes clients and the iNotes Domino servers. The BIG-IP provides server load balancing, high availability, server health monitoring, and SSL offload services. Additionally, the BIG-IP provides TCP and HTTP protocol optimizations, enabling a superior user experience. The BIG-IP LTMs are deployed as an active-standby pair to provide high availability.
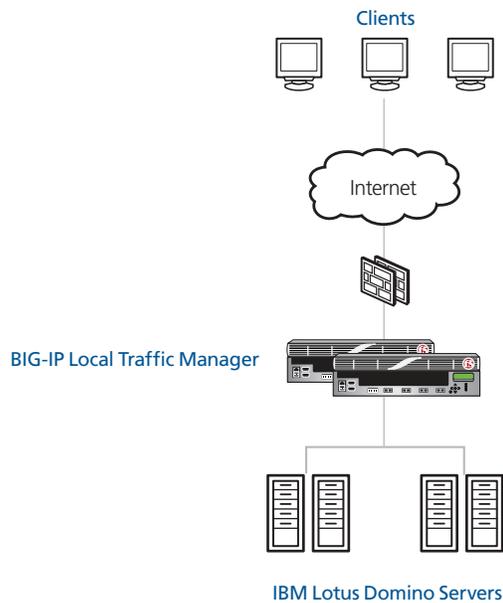
Figure 1: _Simple, logical configuration example_

Configuring the BIG-IP system for IBM Lotus iNotes

Use the following table to configure the BIG-IP system for iNotes. The tables contain a list of BIG-IP LTM configuration objects along with any non-default settings you should configure as a part of this deployment. Unless otherwise specified, settings not mentioned in the table can be configured as applicable for your configuration. For specific instructions on configuring individual objects, see the online help or product manuals.

BIG-IP LTM Object	Non-default settings/Notes		
Health Monitor (*Main tab-->Local Traffic -->Monitors*)	*Name*	Type a unique name	
	Type	**http**	
	Interval	**30** (recommended)	
	Timeout	**91** (recommended)	
	Send String	*For BIG-IP LTM versions 10.0 and 10.0.1* **GET / HTTP/1.1\r\nHOST: <Your iNotes FQDN>\r\n** *For BIG-IP LTM versions later than 10.0.1* **GET / HTTP/1.1\r\nHOST: <Your iNotes FQDN>\r\n\r\n\r\n**	
	Receive String	**Lotus**[1]	
Pool (*Main tab-->Local Traffic -->Pools*)	*Name*	Type a unique name	
	Health Monitor	Select the monitor you created above	
	Slow Ramp Time[2]	**300**	
	Load Balancing Method	**Least Connections (Node)**	
	Address	Type the IP Address of an iNotes node	
	Service Port	**80** Click **Add** to repeat Address and Service Port for all nodes	
Profiles (*Main tab-->Local Traffic -->Profiles*)	*Persistence* (*Profiles-->Persistence*)	Name	Type a unique name
		Persistence Type	**Cookie**
	HTTP (*Profiles-->Services*)	Name	Type a unique name
		Parent Profile	**http**
		Rewrite Redirect[3]	**Matching**[3]
	TCP WAN (*Profiles-->Protocol*)	Name	Type a unique name
		Parent Profile	**tcp-wan-optimized**
	TCP LAN (*Profiles-->Protocol*)	Name	Type a unique name
		Parent Profile	**tcp-lan-optimized**
	Client SSL[3] (*Profiles-->SSL*)	Name	Type a unique name
		Parent Profile	**clientssl**
		Certificate and Key	Select the Certificate & Key you imported
Virtual Servers (*Main tab-->Local Traffic -->Virtual Servers*)	*Name*	Type a unique name.	
	Address	Type the IP Address for the virtual server	
	Service Port	**443** (for SSL offload) or **80** (if not offloading SSL)	
	Protocol Profile (client)[2]	Select the WAN optimized TCP profile you created	
	Protocol Profile (server)[2]	Select the LAN optimized TCP profile you created	
	HTTP Profile	Select the HTTP profile you created	
	SSL Profile (Client)[3]	Select the Client SSL profile you created	
	SNAT Pool	**Automap**	
	Default Pool	Select the pool you created	
	Persistence Profile	Select the Persistence profile you created	

[1] If you modified the login screen, you may have to adjust the Receive String to match a string that appears on your home screen.
[2] You must select **Advanced** from the **Configuration** list for these options to appear
[3] *Only required if offloading SSL on the BIG-IP LTM. You must have already imported a valid certificate and key onto the system.*

This completes the base configuration.

Appendix: Optional configuration for highly available implementations

Lotus Domino Notes servers can be deployed in several architectures. When deploying Notes in a High Availability architecture, one of these configurations is referred to as a Non-Mirrored Cluster. When configured in this manner, a user's mailbox data exists on more than one member of the cluster, but not all of the members in the cluster, as the mailbox is not replicated to all members of the cluster.

IBM and F5 have created a joint solution to support this advanced architecture. There are 2 requirements for this:

➤ The creation of the "Load Balancer Assistance Service". This is an additional web form, running on each server in the cluster, that provides information to the BIG-IP about the exact URL location of a user's mailbox. It inserts a custom HTTP Header containing a list of members in the cluster that have a copy of a user's mailbox.

➤ The creation of the BIG-IP iRule. This is high performance runtime software that will query the cluster members, and using the information provided in the custom HTTP header, correctly route each user's request to the appropriate server.

Important → *You must read and understand the details of this architecture and solution before attempting to configure it in your environment. For more information on how this is configured, see the IBM Developer Works article Achieving high availability with IBM Lotus iNotes: https://www.ibm.com/developerworks/lotus/library/inotes-avail/.*

Configuring the DNS settings

In this section, you configure the DNS settings on the BIG-IP to point to the same DNS server that Lotus iNotes is using.

Note → *DNS lookups go out over one of the interfaces configured on the BIG-IP system, not the management interface. The management interface has its own, separate DNS settings.*

Important → *The BIG-IP system must have a Route to the DNS server. The Route configuration is found on the Main tab by expanding Network and then clicking Routes. For specific instructions on configuring a Route on the BIG-IP system, see the online help or the product documentation.*

To configure DNS settings

1. On the Main tab, expand **System**, and then click **Configuration**.

2. On the Menu bar, from the **Device** menu, click **DNS**.

3. In the **DNS Lookup Server List** row, complete the following:

   a. In the **Address** box, type the IP address of the same DNS server that Lotus iNotes uses.

   b. Click the **Add** button.

4. Click **Update**.

Creating Data Group Lists

Before we create the iRule, we create the Data Group List that the iRule uses.

Critical → *It is important to name the Data Group carefully as it is referenced by the iRule we create in the next procedure. If you modify the Data Group name in step 4, you must also modify it in the iRule.*

To create an string data group

1. On the Main tab, expand **Local Traffic**, and then click **iRules**.

2. On the Menu bar, click **Data Group List**.

3. In the upper right corner of the screen, click **Create**.

4. In the **Name** box, type **NSLOOKUPSERVER**.

5. From the **Type** list, select **String**.

6. In the **String** box, type the FQDN host name, such as **domino-host1.example.com**.

7. In the **Value** box, type the associated IP address, such as **10.100.100.51**.

8. Click **Add**. The entry appears in the String Records box.

9. Repeat steps 6 - 9 until you have entered all IP addresses. In our example, we add our 4 servers.

10. Click **Finished**.

Creating the iRule

The iRule that follows is a example of what is needed to implement this solution. In our example, we have the Log messages commented out. To enable logging, simply remove the comment symbol (#).

Critical

Be sure to change the name of the iNotes pool to match the names you gave the pool.

To create the iRule

1. On the Main tab, expand **Local Traffic**, click **iRules**, and then click the **Create** button.

2. In the **Name** box, give the iRule a unique name. We use **inotes_irule**.

3. In the **Definition** section, copy and paste the iRule on the following page, omitting the line numbers.

    Note: *Logging has been completely commented out of the iRule below for best performance. For troubleshooting or debugging you should uncomment the logging statements in the iRule.*

    Because of the length of the iRule, instead of copying and pasting it from the following pages, you can download it:
    http://www.f5.com/solution-center/deployment-guides/files/inotes-irule.txt

4. Click the **Finished** button.

```
1   when CLIENT_ACCEPTED {
2     #log local0. "ACC - got new connect"
3     set retries 0
4     set server_needed 0
5     set server_selected "none"
6   }
7
8   when HTTP_REQUEST {
9     # when opening Notes database, set server_needed 1
10    if {([HTTP::uri] ends_with ".nsf?OpenDatabase") and not ([HTTP::uri] contains "names.nsf") and not ([HTTP::uri] contains "iwaredir.nsf")
       and not ($server_selected == "new") and not ($server_selected == "orig") }{
11      set original_request [HTTP::request]
12      set server_needed 1
13      set nsf "[substr [HTTP::uri] 1 ".nsf"].nsf"
14      #log local0. "REQ - Server needed: $server_needed"
15      #log local0. "REQ - NSF: $nsf"
16      HTTP::uri /iwaredir.nsf/ServersLookup?OpenForm&nsfpath=$nsf
17      #log local0. "REQ - uri: /iwaredir.nsf/ServersLookup?OpenForm&nsfpath=$nsf"
18    } else {
19      set server_needed 0
20        set original_request [HTTP::request]
21    }
22    # when HTTP::retry with new server from X-header, select it from pool
23    if { $server_selected == "new" } {
24      pool [LB::server pool] member $dest
25      #log local0. "REQ - Using selected new server [LB::server addr] of pool: [LB::server pool] (Destination: $dest)"
26    }
27  }
28
29  when LB_SELECTED {
30     # when HTTP::retry because of 404-Code, reselect member
31     # F5 unit sends a new session cookie
32    if { ($retries > 0) and ($retries < 9) } {
33      LB::reselect pool [LB::server pool]
34      #log local0. "SELE - Reselection No. $retries"
35          }
36  }
37
38  when HTTP_RESPONSE {
39    #log local0. "RESP - Used server [LB::server addr] of pool: [LB::server pool]"
40
41    # when 404-Code after automatic reselection of BIG-IP device to wrong server occurs, do another try
42    if { ([HTTP::status] == 404) and ($retries < 8) } {
43      #log local0. "ALERT: 404"
44        incr retries
45        #log local0. "RESP - Retrying original request with reselection No. $retries"
47          HTTP::retry $original_request
48        }
49    # generate new session cookie (code from DevCentral) after member selection based on X-Headers because BIG-IP does not send one
50    if { $server_selected == "new" } {
51      set member "[LB::server addr]:[LB::server port]"
52      scan $member "%u.%u.%u.%u:%u" a b c d e
53      set pcookie "[scan [expr ($d<<24)|($c<<16)|($b<<8)|$a] %u].[expr 256*$e].0000"
54      HTTP::cookie insert name BIGipServer[LB::server pool] value $pcookie path "/"
55      #log local0. "RESP - New persistence cookie sent for $dest"
56          set server_selected "none"
57        }
58    # build list of iNotes-Server from X-Domino Header
59    if { $server_needed == 1} {
60      set server_list1 [split [HTTP::header X-Domino-ClusterServers], ,]
61      set server_list2 [split [HTTP::header X-Domino-ReplicaServers], ,]
62      set server_list "${server_list1} ${server_list2}"
```

This rule continues on the following page

```
63        #log local0. "RESP - Server_list_Cluster: $server_list1"
64        #log local0. "RESP - Server_list_Replica: $server_list2"
65        #log local0. "RESP - Server_list: $server_list"
66        HTTP::collect [HTTP::header Content-Length]
67
68        # check if we are already on right server and then set server_selected "orig"
69        foreach {svr} $server_list {
70          if { "" ne $svr }{
71            set dest [class search -value NSLOOKUPSERVER equals "[string trim $svr]"]
72              if {[LB::server addr] == $dest } {
73              #log local0. "RESP - Already on right server: $dest"
74              set server_selected "orig"
75            }
76          }
77        }
78
79        foreach {svr} $server_list {
80          if { "" ne $svr }{
81            if { $server_selected == "orig" } {
82              #log local0. "RESP - Retrying original request for original server"
83              HTTP::retry $original_request
84              break
85            }
86            # when server in list is up, do HTTP::retry
87            if { [LB::status pool [LB::server pool] member $dest 80] eq "up" } {
88              #log local0. "RESP - Status of selected server $dest, pool [LB::server pool]: [LB::status pool [LB::server pool] member $dest 80]"
89              set server_selected "new"
90              #log local0. "RESP - Retrying original request for new server"
91              HTTP::retry $original_request
92              break
93            }
94          }
95        }
96      }
97 }
```

Modifying the virtual server to reference the iRule

The next task is to modify the virtual server you created in Creating the virtual server, on page 9 to use the iRule you just created.

To modify the existing virtual server

1. On the Main tab, expand **Local Traffic**, and then click **Virtual Servers**.

2. From the **Virtual Server** list, click the iNotes virtual server you created. In our example, we click **inotes-vs**.

3. On the Menu bar, click **Resources**. The Resources page for the virtual server opens.

4. In the **iRules** section, click the **Manage** button. The Resource Management screen opens.

5. From the **Available** list, select the iRule you just created and then click the Add (**<<**) button. In our example, we select **inotes-irule**.

6. Click the **Finished** button.

This completes the configuration.

Document Revision History

Version	Description	Date
1.0	New guide	N/A
1.1	Removed support for BIG-IP LTM versions prior to 10.0. For this guide, you must be running LTM version 10.0 or later.	N/A
1.2	Corrected the optional iRule on page 14 to add missing spaces in the HTTP Response section.	N/A
1.3	Corrected the optional iRule on page 14 to the correct name of the Data Group.	N/A
1.4	Added instructions for configuring DNS on the BIG-IP system if you are using the iRule described in Appendix A.	07-03-2012
1.5	Added a critical note to the prerequisites section with a link to IBM documentation which must be followed for this solution to work.	11-01-2012
1.6	- Added support for BIG-IP LTM version 11.2 - Corrected white space and other issues in the iRule in the Appendix. - Modified the Send Strings for the monitor. - Updated the style of the guide.	11-16-2012
2.0	- Updated the iRule in the optional appendix to include enhancements and support for CMP. - Updated the Data Group configuration in the appendix from a Type of Address to a Type of String.	11-26-2012
2.1	The iNotes iRule has been updated with several enhancements: - The iRule supports newer versions of iNotes, where additional URIs needed to be matched for the server lookup functionality to be invoked. - The iRule includes a new set of checks to avoid 404 errors when a particular server went down (contributed by F5 DevCentral user Matthias (MaHHF5)) and tested by F5 Networks.	09-19-2013

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