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1. ANNEXURE

1.1 Introduction

This document is a supporting document, while installing PLATO applications you may find reference.

1.2 How to do Multi Node setup(High Availability Architecture)

1.2.1 Configuration Server Related Changes:

The below changes are to be made in the PROPERTIES table pointed to by the Configuration Server:

A) For the Discovery Server:

PLATO Discovery Service should have an entry for all of its peer PLATO Discovery Service's configured through `eureka.client.serviceUrl.defaultZone`. This will hold a comma-separated list of all the peer PLATO Discovery services.

Also to enable the peer aware mode for the PLATO Discovery Service we should set the `eureka.client.register-with-eureka` to true.

ID	APPLICATION	PROFILE	LABEL	KEY	VALUE
1	plato-discovery-service	jdbc	jdbc	eureka.client.serviceUrl.defaultZone	http://<IP of the server where the first instance of PLATO Discovery Service is running>:<PORT where the first instance of PLATO Discovery Service is running>/plato-discovery-service/eureka,http://<IP of the server where the second instance of PLATO Discovery Service is running>:<PORT where the second instance of PLATO Discovery Service is running>/plato-discovery-service/eureka
2	plato-discovery-service	jdbc	jdbc	eureka.client.register-with-eureka	true
3	plato-discovery-service	jdbc	jdbc	server.port	<< PORT Number where the PLATO Discovery Service is running >>

B) For the Individual Services:

Each service should have an entry of all the PLATO Discovery Service's configured through `eureka.client.serviceUrl.defaultZone`. This will hold a comma separated list of all the PLATO Discovery services.

ID	APPLICATION	PROFILE	LABEL	KEY	VALUE
1	<<service-name>>	jdbc	jdbc	eureka.client.serviceUrl.defaultZone	http://<IP of the server where the first instance of PLATO Discovery Service is running>:<PORT where the first instance of PLATO Discovery Service is running>/plato-

					discovery-service/eureka,http://<IP of the server where the second instance of PLATO Discovery Service is running>:<PORT where the second instance of PLATO Discovery Service is running>/plato-discovery-service/eureka
--	--	--	--	--	--

1.2.2 Plato UI Configuration Server Related Changes:

For each of the product registered in PRODUCT_SERVICES_ENV_LEDGER, we need to change the URL to point to the Load Balancer of the PLATO API Gateway Service

ID	PRODUCT_NAME	URL
1	<<PRODUCT NAME>>	<< HTTP URL OF THE LOAD BALANCER >>

1.2.3 setDomainEnv.sh related changes:

A) *For all the Micro Services:*

Individual MICRO services should now access the PLATO Config Service via the Load Balancer URI i.e. configured in the server runtime. through the property plato.services.config.uri.

Here, plato.services.config.uri should point to the URI of the load balancer. The format of the same would be,

```
-Dplato.services.config.uri=http://<< IP OF THE LOAD BALANCER >>:<< PORT OF THE LOAD BALANCER >>
```

B) *For the UI APPSHELL,*

UI APPShell should now access the Gateway Service via the Load balancer URI i.e. configured in the server runtime. e.g -Dapigateway.url.

Here apigateway.url should point to the host and port of the load balancer.

```
-Dapigateway.url=http://<< IP OF THE LOAD BALANCER >>:<< PORT OF THE LOAD BALANCER >>
```

1.2.4 Requirement of Load Balancers:

Load Balancers are required for PLATO API GATEWAY Service, PLATO Configuration Service and PLATO UI APP SHELL.

PLATO API Gateway Service: PLATO API Gateway Service acts as a single point of entry for both UI and External Systems to access the underlying services. In a multi node deployment where multiple PLATO API Gateway Services are deployed, we would need a single URI for accessing the multi node deployments of the PLATO API Gateway Services. This Load Balancer would help us to achieve that functionality.

PLATO Configuration Service All the domain services access PLATO Configuration Service for retrieving their configurations. In a multi node deployment where multiple PLATO Configuration Services are deployed, we would need a single URI for accessing the multi node deployments of the PLATO Configuration Services. This Load Balancer would help us to achieve that functionality.

PLATO UI APP SHELL: The PLATO UI App Shell acts as the single user interface for the users. In a multi node deployment where multiple instances of PLATO UI APP SHELL are deployed, we would need a single URI for accessing the multi node deployments of the PLATO UI APP SHELL. This Load Balancer would help us to achieve that functionality.

1.3 PLATO LOAD BALANCER SERVICES

1.3.1 Introduction

Plato Load Balancer Services can be used as an optional Load Balancer for a service when required. It is available as a WAR file and the configuration can be done directly inside the WAR file.

1.3.2 Configuration and Deployment

Open the war file using extraction tools and open the web.xml file.
The web.xml file is as shown below:

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns:wls="http://xmlns.oracle.com/weblogic/weblogic-web-app"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://xmlns.oracle.com/weblogic/weblogic-web-app"
  app">
  <servlet>
    <servlet-name>HttpClusterServlet</servlet-name>
    <servlet-class>
      weblogic.servlet.proxy.HttpClusterServlet
    </servlet-class>
    <init-param>
      <param-name>WebLogicCluster</param-name>
      <param-value>HOST_1:PORT_1|HOST_2:PORT_2|HOST_3:PORT_3</param-
value>
    </init-param>
  </servlet>
  <servlet-mapping>
    <servlet-name>HttpClusterServlet</servlet-name>
    <url-pattern>/</url-pattern>
  </servlet-mapping>
  <servlet-mapping>
    <servlet-name>HttpClusterServlet</servlet-name>
    <url-pattern>*. *</url-pattern>
  </servlet-mapping>
</web-app>
```

Edit the HOST:PORT in the web.xml file. The host and port values should be added according to the requirement.

After editing the web.xml file the WAR file can be deployed directly into the managed server. The HOST:PORT of the plato-load-balancer-services would act as the load balancer URL for the mentioned HOST:PORT values in the web.xml file.

1.4 NGINX LOAD BALANCER SERVICES

1.4.1 Installation and Setup

Download:

1. Download the tar file from nginx.org/download/ Index list.
2. Extract the tar file using `tar -xvf` command

Installation:

1. You can choose installation location using `--prefix=path` parameter.
2. You can find `./configure` file in the extracted folder above. For installation follow the below procedure
3. Inside the extracted folder, run the following commands one after other

```
./configure --prefix=/scratch/nginx --with-http_ssl_module
make
make install
```

4. You can find the nginx installed at `/scratch/nginx`.

Start and Stop Procedure:

1. Inside the installed directory, we can find `sbin` folder. Run `./nginx` file inside `sbin` folder to start nginx.
2. Write `./nginx -s stop` command in order to stop nginx.

Configuration:

The configuration is done in the `nginx.conf` file inside the `conf` directory.

1. For Load Balancing, create an upstream and place the urls to be routed

```
upstream config{
    server 10.184.155.115:7004;
    server 10.184.148.116:7004;
}

upstream gateway{
    server 10.184.155.115:7005;
    server 10.184.148.116:7005;
}
```


Here there are 2 load balancers defined. Default load balancing technique: *Round Robin*

This block must be placed inside the http block.

2. Server block also needs to be configured. This is also placed inside the http block. The server block is used for routing purposes.

The block looks like below.

```
server {
    listen      8090;
    server_name _;

    location / {
        proxy_pass http://config;
    }
    location /api {
        rewrite /api/(.*) /$1 break;
        proxy_pass http://gateway;
    }

    error_page 500 502 503 504 /50x.html;
    location = /50x.html {
        root    html;
    }
}
```

Here 8090 acts as the listen port for nginx.

The “*server_name*” property should be given if the requests are from a particular server. Here Server accepts requests from any server.

proxy_pass is used to route the request and the format of the request is defined in the location tag.

rewrite tag is use dto manipulate the requests.

Note : Make sure the firewall is open for other ips to pass the request.

1.4.2 Load Balancer Route Configurations:

The below configurations gives the route configurations for the load balancer.

Please note that the underlying syntax and semantics may vary from load balancer to load balancer.

```
    upstream config-service{
        server << IP Or Hostname of the PLATO Configuration Service 1 >>:<<
Port of the PLATO Configuration Service 1 >>;

        server << IP Or Hostname of the PLATO Configuration Service 2 >>:<<
Port of the PLATO Configuration Service 2 >>;

        server << IP Or Hostname of the PLATO Configuration Service 3 >>:<<
Port of the PLATO Configuration Service 3 >>;

        server << IP Or Hostname of the PLATO Configuration Service N >>:<<
Port of the PLATO Configuration Service N >>;

    }

    upstream api-gateway{

        server << IP Or Hostname of the PLATO API Gateway Service 1 >>:<<Port
of the PLATO API Gateway Service 1 >>;

        server << IP Or Hostname of the PLATO API Gateway Service 2 >>:<<Port
of the PLATO API Gateway Service 2 >>;

        server << IP Or Hostname of the PLATO API Gateway Service 3 >>:<<Port
of the PLATO API Gateway Service 3 >>;

        .
        .

        server << IP Or Hostname of the PLATO API Gateway Service N >>:<<Port
of the PLATO API Gateway Service N >>;

    }

    .
    .
```

```
    upstream <<Context Root of the PLATO UI APP Shell>> {
        server << IP Or Hostname of the PLATO UI APP Shell 1 >>:<< Port of the
PLATO Configuration Service 1 >>;

        server << IP Or Hostname of the PLATO UI APP Shell 2 >>:<< Port of the
PLATO UI APP Shell 2 >>;

        server << IP Or Hostname of the PLATO UI APP Shell 3 >>:<< Port of the
PLATO UI APP Shell 3 >>;

        .
        .

        server << IP Or Hostname of the PLATO UI APP Shell N >>:<< Port of the
PLATO UI APP Shell N >>;

    }

server {

    listen << PORT OF THE LOAD BALANCER >>;

    server_name _;

    location /config-service {
        proxy_pass http://config-service;
    }

    location /api-gateway {
        proxy_pass http://api-gateway;
    }

    location /<<Context Root of the PLATO UI APP Shell>> {

        proxy_pass http://<<Context Root of the PLATO UI APP Shell>>;

    }

    error_page 500 502 503 504 /50x.html;
    location = /50x.html {
        root html;
    }

}
```