2017

NetScaler Automation

Talking NITRO with PowerShell

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Agenda

- Introduction
  - RESTful APIs & JSON
  - Using Invoke-RestMethod
- NetScaler Configuration Automation w/ NITRO
  - Basic System Settings
  - NetScaler Load Balancing
- Bonus Slides
  - Monitoring vServers and Services

Introduction

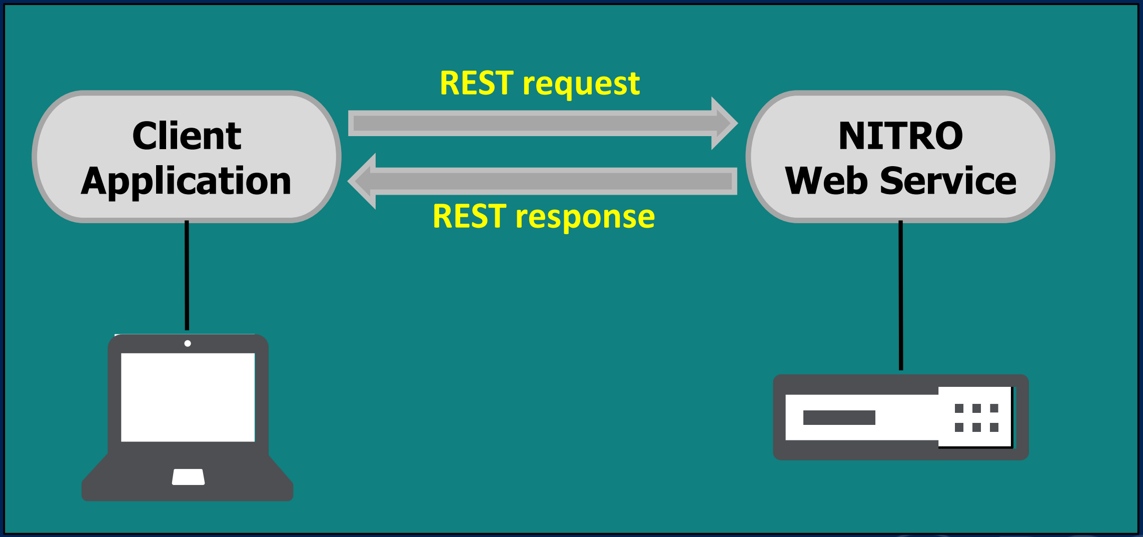
REST API & JSON

Restful APIs

- REpresentational State Transfer (REST)
  - **Client-Server**
  - Stateless
  - Standards-based (runs on top of **HTTP protocol**)
  - Easily used in presence of **firewalls** (port 80 or 443)

Restful APIs

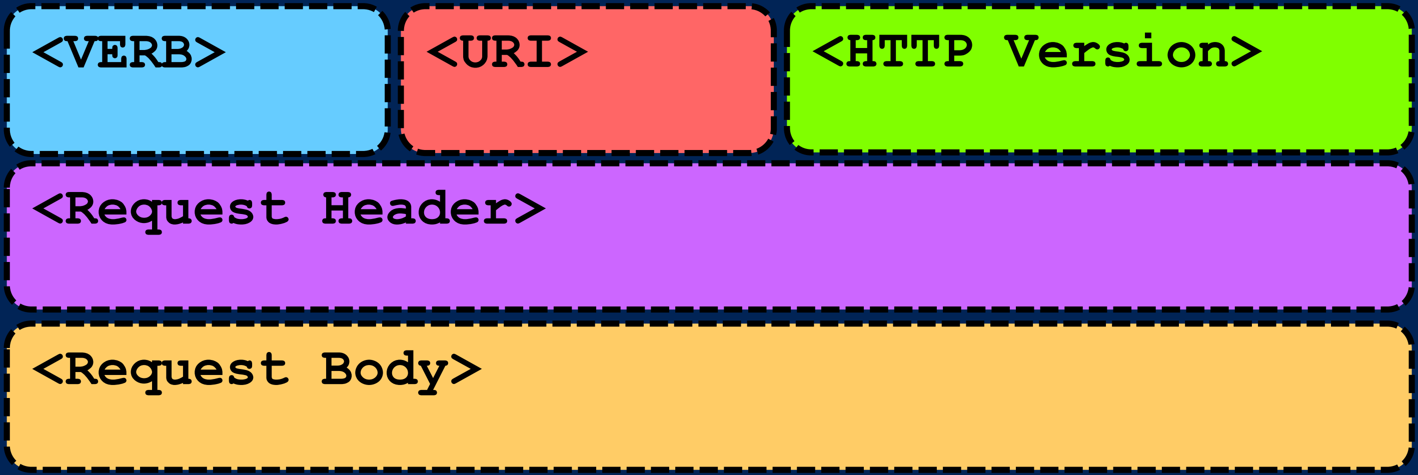
- NITRO (Restful service on NetScaler)
  - Communicate with NetScaler programmatically
  - Human readable **HTTP-based** interaction
  - **NITRO SDKs** available for multiple languages (Java, Python, .NET, REST)



Restful APIs

A way to interact with an API via series of HTTP calls

- **VERB:** HTTP Method (GET, PUT, POST, DELETE)
- **URI:** resource on which the operation is performed
- **HTTP Version:** usually "HTTP/1.1”
- **Request Header:** contains metadata (formatting, etc.)
- **Request Body:** actual message content



NITRO

<VERB> <URI> <HTTP Version>

A way to interact with an API via series of HTTP calls

- **HTTP Method** (GET, PUT, POST, DELETE)
- **URL:** http://**<ns-ipaddress>**/nitro/v1**/config /nsfeature?action=enable**
    - Add a **basic URL stem** to use with NITRO:
        - ~~http://<NSIP>/nitro/v1/**stat/** –> entity and system statistics~~
        - http://<NSIP>/nitro/v1/**config/** –> configuration operations
    - Add the **resource type** to the **URL** (and in some cases also the **resource name**)
    - Specify an **action** for the **URL** (bind, unset, enable, disable)

NITRO

```
<Request Header>
<Request Body>
```

A way to interact with an API via series of HTTP calls

- Specify the **Content-Type** in the **Request Header**:
  - Content-Type: application/vnd.com.citrix.netscaler.**nsfeature+json**

(or generic content-type: **application/json**)

- Add the **JSON payload** to the **Request Body**:

```
{
   "login":
   {
      "username":"admin",
      "password":"verysecret"
   }
}
```

```
{
   "lbvserver":[
      {"name":"lbvserver1","servicetype":"http"},
      {"name":"lbvserver2","servicetype":"ssl"},
      {"name":"lbverver3","servicetype":"ftp"}
   ]
}
```

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NITRO

A way to interact with an API via series of HTTP calls

url:	http://<ns-ipaddress>/nitro/v1/config/nsfeature?action=enable	**method:** POST
header:	Content-Type: application/json	

payload:

```
{
   "nsfeature":
   {
      "feature":
      [
         "LB",
         "SSL",
         "SSLVPN"
      ]
   }
}
```

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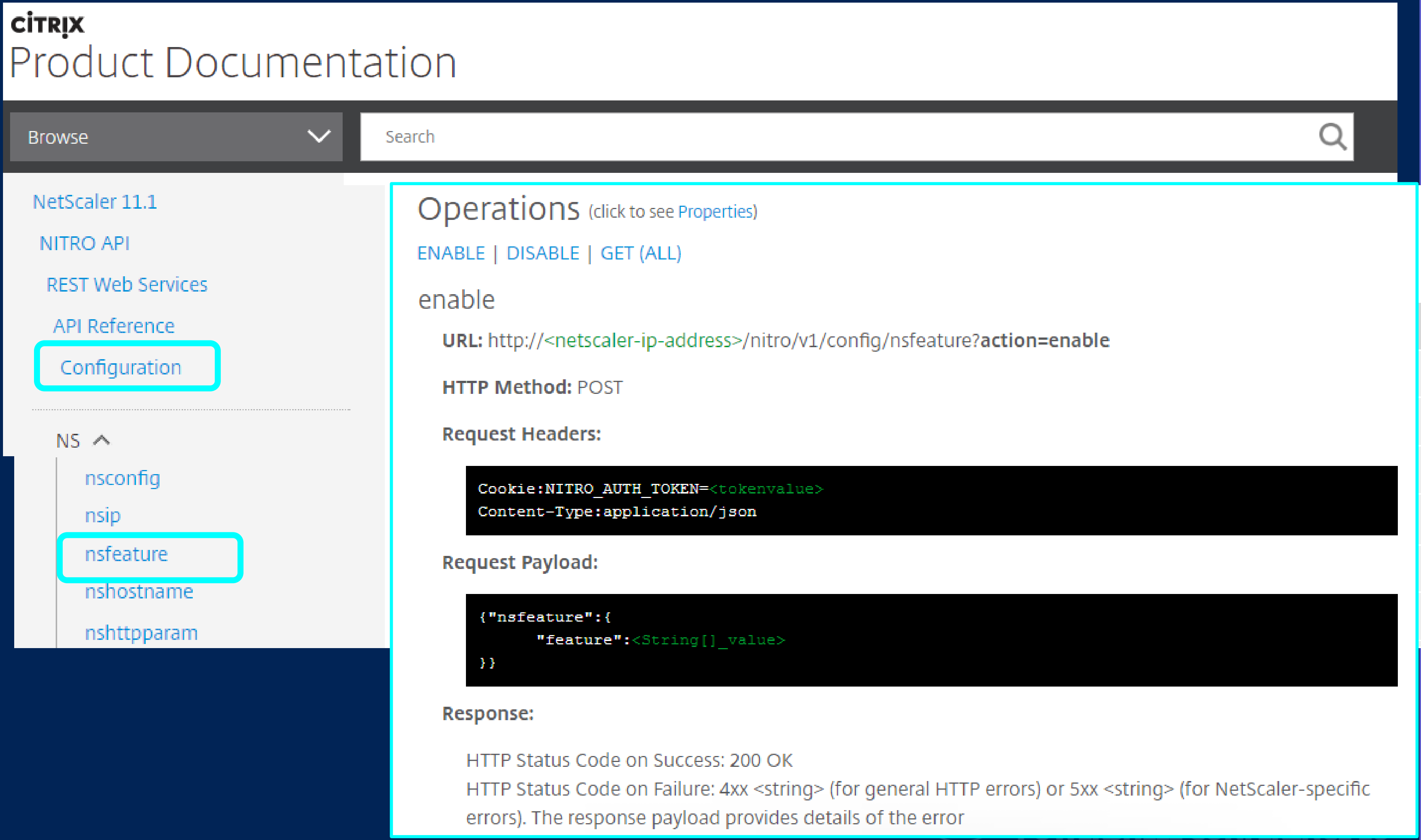
NITRO API reference



CiTRIX
Product Documentation

NetScaler 11.1
NITRO API
REST Web Services
API Reference
Configuration

NS
nsconfig
nsip
nsfeature
nshostname
nshttpparam

Operations (click to see Properties)

ENABLE | DISABLE | GET (ALL)

enable

URL: http://<netscaler-ip-address>/nitro/v1/config/nsfeature?**action=enable**

HTTP Method: POST

Request Headers:

```
Cookie:NITRO_AUTH_TOKEN=<tokenvalue>
Content-Type:application/json
```

Request Payload:

```
{"nsfeature":{
      "feature":<String[]_value>
}}
```

Response:

HTTP Status Code on Success: 200 OK
HTTP Status Code on Failure: 4xx <string> (for general HTTP errors) or 5xx <string> (for NetScaler-specific errors). The response payload provides details of the error

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NITRO requirements

NetScaler 9.2 or later

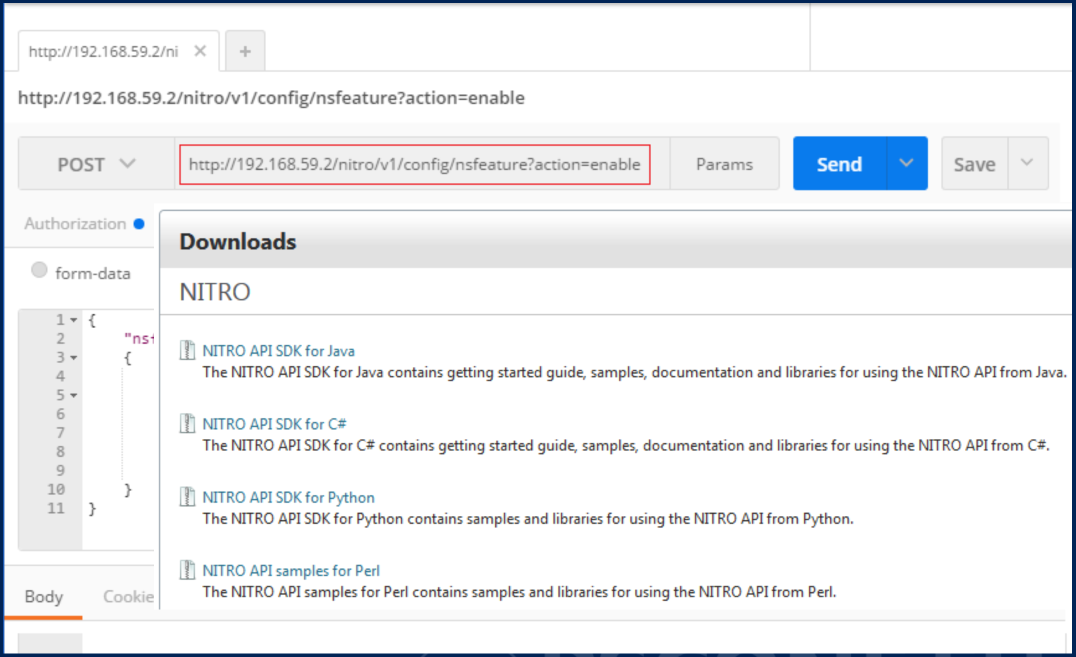
- Account with **execute** permissions
- NetScaler **NSIP** (or SNIP) with Management Access enabled

REST Client

- Use a client like cURL or **POSTMAN**

Programming language w/ REST su

- Download the **NITRO SDK**



http://192.168.59.2/nitro/v1/config/nsfeature?action=enable

http://192.168.59.2/nitro/v1/config/nsfeature?action=enable

Downloads

NITRO

NITRO API SDK for Java
The NITRO API SDK for Java contains getting started guide, samples, documentation and libraries for using the NITRO API from Java.

NITRO API SDK for C#
The NITRO API SDK for C# contains getting started guide, samples, documentation and libraries for using the NITRO API from C#.

NITRO API SDK for Python
The NITRO API SDK for Python contains samples and libraries for using the NITRO API from Python.

NITRO API samples for Perl
The NITRO API samples for Perl contains samples and libraries for using the NITRO API from Perl.

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Automating NetScaler Configurations

A Basic Example

NetScaler Automation w/ NITRO

Global NetScaler Features

url:	http://<ns-ipaddress>/nitro/v1/config/nsfeature?action=enable	method: POST
header:	Content-Type: application/json	

payload:

```
{
    "nsfeature":
    {
        "feature":
        [
            "LB",
            "SSL",
            "SSLVPN"
        ]
    }
}
```

NetScaler Automation w/ PowerShell

PowerShell Invoke-RestMethod cmdlet

```
#region Enable NetScaler Basic & Advanced Features
    $ContentType = "application/json"

    # Specifying the correct URL
    $strURI = "http://$NSIP/nitro/v1/config/nsfeature?action=enable"

    # Creating the right payload formatting (mind the Depth for the nested arrays)
    $payload = @{
    "nsfeature"= @{
        "feature"=@("LB","SSL","SSLVPN")
        }
    } | ConvertTo-Json -Depth 5

    # Method #1: Making the REST API call to the NetScaler
    $response = Invoke-RestMethod -Method Post -Uri $strURI -Body $payload `
                    -ContentType $ContentType -WebSession $NetScalerSession
#endregion Enable NetScaler Basic & Advanced Features
```

NetScaler Automation w/ PowerShell

Arrays & Hashtables Formatting

JSON	PowerShell
Array:	Array:
`["LB","SSL","SSLVPN"]`	`@("LB","SSL","SSLVPN")`

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NetScaler Automation w/ PowerShell

Arrays & Hashtables Formatting

JSON	PowerShell

```
{
    "nsfeature":
    {
        "feature":["LB","SSL","SSLVPN"]
    }
}
```

```
@{
    "nsfeature"= @{
        "feature"=@("LB","SSL","SSLVPN")
    }
} | ConvertTo-Json
```

NetScaler Automation w/ PowerShell

ConvertTo-Json Depth parameter

```
# Creating the right payload formatting (default Depth = 2)
@{
    "ns"= @{
        "name"="testVPX";
        "ip_address"="192.168.59.2";
        "network_interfaces"=@(
            @{"port_name"="10/1"},
            @{"port_name"="10/2"}
        )
    }
} | ConvertTo-Json
```

```
{
    "ns":  {
               "network_interfaces":  [
                                          "System.Collections.Hashtable",
                                          "System.Collections.Hashtable"
                                      ],
               "name":  "testVPX",
               "ip_address":  "192.168.59.2"
           }
}
```

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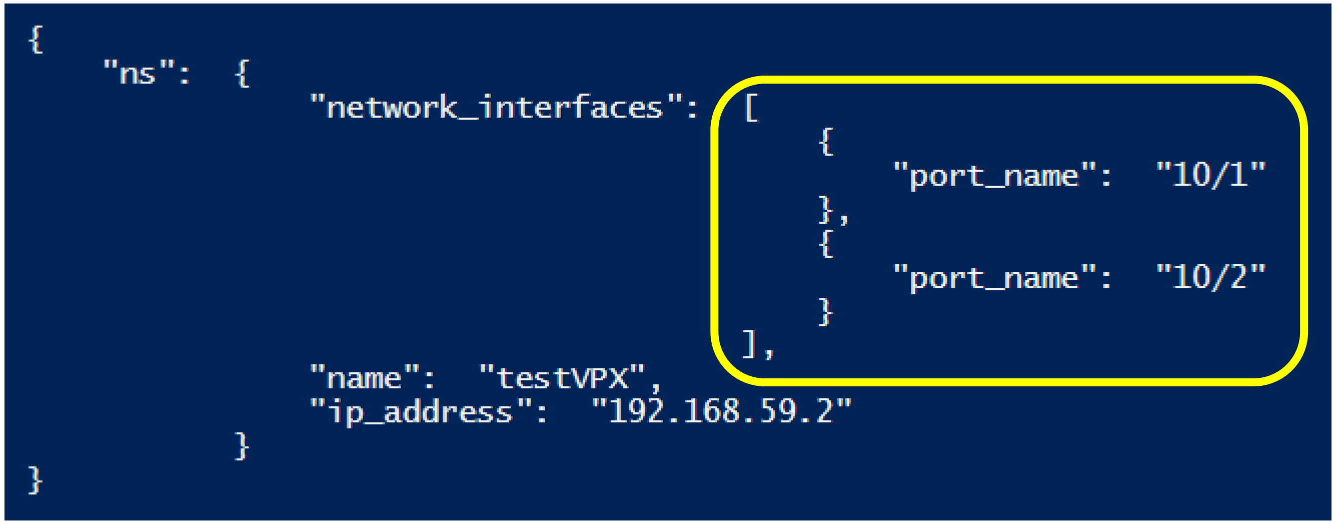
NetScaler Automation w/ PowerShell

ConvertTo-Json Depth parameter

```
# Creating the right payload formatting (default Depth = 2)
@{
    "ns"= @{
        "name"="testVPX";
        "ip_address"="192.168.59.2";
        "network_interfaces"=@(
            @{"port_name"="10/1"},
            @{"port_name"="10/2"}
        )
    }
} | ConvertTo-Json -Depth 5
```



```
{
    "ns":  {
               "network_interfaces":  [
                                          {
                                              "port_name":  "10/1"
                                          },
                                          {
                                              "port_name":  "10/2"
                                          }
                                      ],
               "name":  "testVPX",
               "ip_address":  "192.168.59.2"
           }
}
```

Demo

Basic NetScaler Configuration

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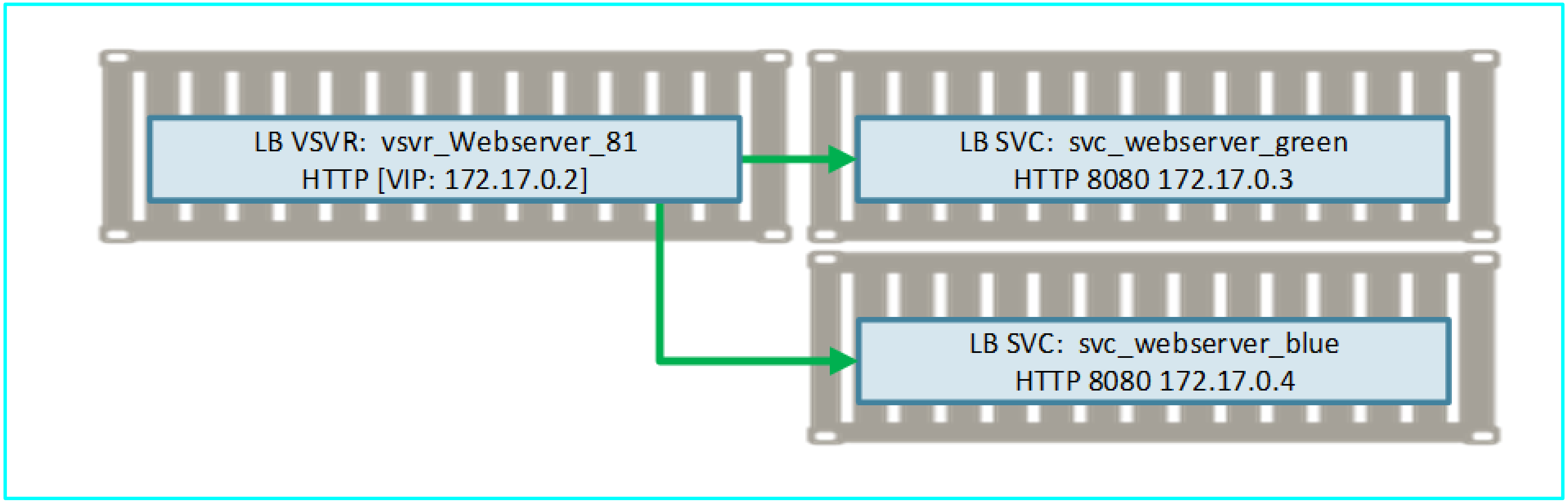
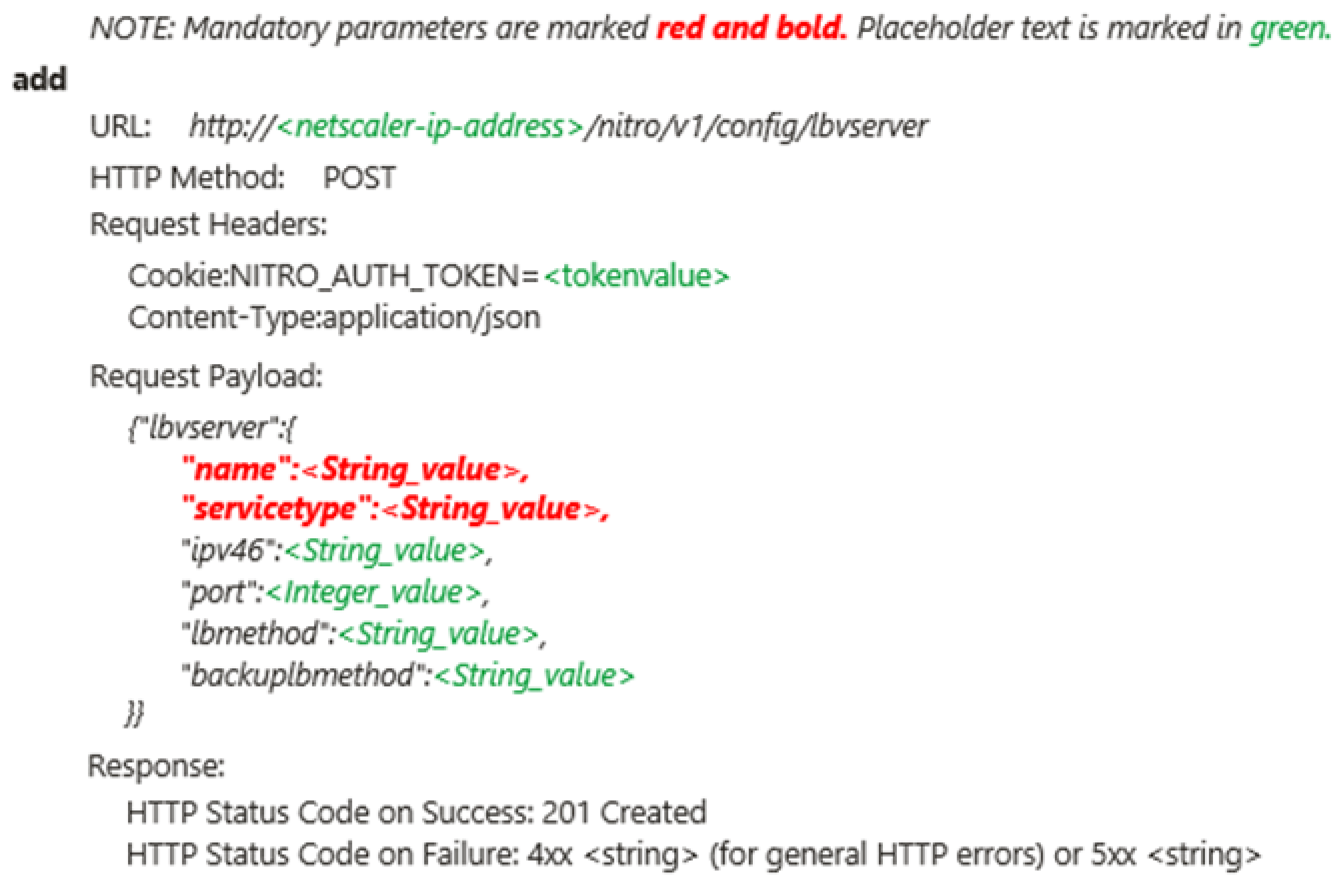
Automating NetScaler Configurations

CPX Load Balancing


LB VSVR: vsvr_Webserver_81
HTTP [VIP: 172.17.0.2]
LB SVC: svc_webserver_green
HTTP 8080 172.17.0.3
LB SVC: svc_webserver_blue
HTTP 8080 172.17.0.4

NetScaler Automation w/ NITRO

NetScaler CPX Load Balancing – LB vServer



*NOTE: Mandatory parameters are marked **red and bold**. Placeholder text is marked in green.*

add

URL: *http://<netscaler-ip-address>/nitro/v1/config/lbvserver*

HTTP Method: POST

Request Headers:

Cookie:NITRO_AUTH_TOKEN=<tokenvalue>
Content-Type:application/json

Request Payload:

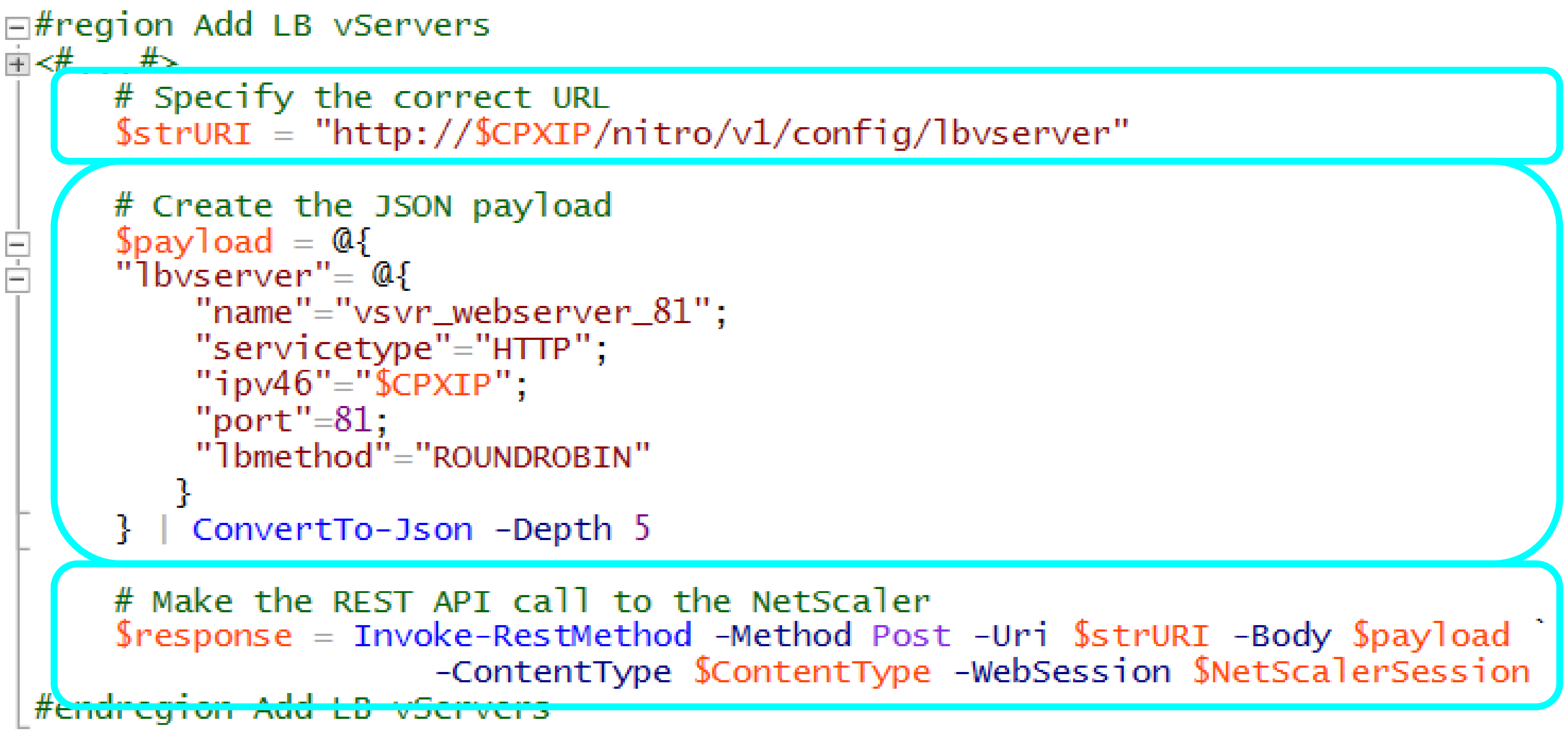
```
{"lbvserver":{
    "name":<String_value>,
    "servicetype":<String_value>,
    "ipv46":<String_value>,
    "port":<Integer_value>,
    "lbmethod":<String_value>,
    "backuplbmethod":<String_value>
}}
```

Response:

HTTP Status Code on Success: 201 Created
HTTP Status Code on Failure: 4xx <string> (for general HTTP errors) or 5xx <string>

NetScaler Automation w/ NITRO

NetScaler Load Balancing – LB vServer



```
#region Add LB vServers
<# ... #>
    # Specify the correct URL
    $strURI = "http://$CPXIP/nitro/v1/config/lbvserver"

    # Create the JSON payload
    $payload = @{
    "lbvserver"= @{
        "name"="vsvr_webserver_81";
        "servicetype"="HTTP";
        "ipv46"="$CPXIP";
        "port"=81;
        "lbmethod"="ROUNDROBIN"
       }
    } | ConvertTo-Json -Depth 5

    # Make the REST API call to the NetScaler
    $response = Invoke-RestMethod -Method Post -Uri $strURI -Body $payload `
                    -ContentType $ContentType -WebSession $NetScalerSession
#endregion Add LB vServers
```

Demo

CPX Load Balancing Configuration

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The Scripts

Where to go next?

GitHub

Check out the PS-NITRO repository

Sharing the **extended** PowerShell **Module** w/ **Community**:

https://github.com/cognitionIT/PS-NITRO

Summary

- Invoke-RestMethod to automate your NetScaler configuration
- Sample scripts on GitHub: https://github.com/cognitionIT/PS-NITRO
- Feel free to reach out for questions, feature requests and code contributions

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Questions?

Bonus Slides

Monitoring

Demo

CPX vServer Monitoring

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Next Steps...

- Now: 15 min break

- Grab a coffee
- Next up:
  - Session: Integrating Lability in a CI/CD Release pipeline
  - Or change track & switch to another room

- Ask me questions or meet me in a breakout session room afterwards

PSCONF.EU
2018

psconf.eu 2018

scheduled to be in the week of

April 16-20, 2018

details on www.psconf.eu as they become available

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About_Author

- 15+ years of Technical Consulting
- 5+ years of DevOps scripting fun

- Citrix CTP (2015 -2017)
- Microsoft MVP for Enterprise Mobility (2017)

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