Service Insertion with ACI using F5 iWorkflow

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F5 EMEA Cloud SE

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• F5 and Cisco ACI Joint Solution
• Cisco ACI L4 – L7 Service Insertion Overview
• F5 and Cisco ACI Integration Models
• F5 BIG-IP Integrate with Cisco ACI as Unmanaged Device
• F5 iWorkflow and Cisco ACI Integration Update
F5 and Cisco ACI Joint Solution
Applications Deployment is Difficult

Traditional Network Service Insertion Challenges

Service Insertion In traditional Networks

Configure Router to steer traffic to/from Load Balancer

Configure firewall rules as required by the application

Configure Load Balancer as required by the application

Configure Switches for L2 connectivity

Configure vFW to protect Virtualized App Tier

Service insertion takes days

Network configuration is time consuming and error prone

Difficult to track configuration on services
How does ACI accelerate Application Deployments?

Application Centric Infrastructure Building Blocks

- **Application** ➔ 3 tier application (WEB-APP-DB) ➔ This may use ADC, FW services
- **End point Group (EPG)** ➔ Grouping of application Components
- **Policy model** ➔ Define QOS, Security, Network, **L4-L7** etc. to be applied to EPG
What does L4-L7 Services in ACI mean?

Moving ADC parameters from vendor device to ACI is not the solution!
Cisco ACI
L4 – L7 Service Insertion Overview
F5 and Cisco ACI Joint Benefits

• Automated L4-L7 application service insertion

• Accelerated application deployments with scalable L4-L7 services

• Application agility & significant reduction in operating costs

• Preserves richness of F5 Synthesis offering. Ease of integration due to rich programmability

• Existing F5 Physical and Virtual appliances, topologies integrate seamlessly with Cisco ACI

• Maintains operational best practices & offers faster provisioning of workflows
ACI Service Automation thru Device Package

F5 Device Package
- Device Package contains
- Configuration Model (XML File)
- Python Scripts

APIC provides extendable policy model through Device Package

Device Package contains XML file defining Device Configuration Model

Provider Administrator can upload a Device Package

Device scripts translates APIC API callouts to device specific callouts

F5 has rich programmability foundation - easier to integrate with Cisco APIC
Web Farm provide services to External Users; Policy Contract defines relationship between Web Farm and Users

Users assign to EPG EXT
Web Farm assign to EPG WEB
Users accessing the Web Servers

Service Graph Insertion at the Policy Contract Subject level

Service Graph contains Function Nodes, Virtual Server is a Function Node

F5 BIG-IPs are Concrete Devices belong to a Logical Device Cluster that enables ADC as a Function Node within a Service Graph
F5 and Cisco ACI Integration Models
**F5 and Cisco ACI Integration Models**

**OPTION A1**
- EPG mode – NOT using service graph

**OPTION A2**
- Unmanaged mode – USING service graph

**OPTION B**
- Service Insertion using F5 Static device package

**OPTION C**
- Service Insertion using F5 iWorkflow Dynamic device package

*F5 direction for Cisco ACI L4-L7 Service Insertion*
F5 BIG-IP
Integrate with Cisco ACI as Unmanaged Device
F5 and Cisco ACI Integration Models

EPG/Unmanaged Mode (Option A1 and A2)
- Define connectivity to ACI Fabric
- No Service Insertion
  - No device package
  - BIG-IP device is not provisioned/managed through APIC
## Difference between EPG and Unmanaged Mode

<table>
<thead>
<tr>
<th>EPG Mode (Option A1)</th>
<th>Unmanaged Mode (Option A2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No service graph representation</td>
<td></td>
</tr>
<tr>
<td>• Manual binding of VLAN’s, binding contracts to EPG’s</td>
<td></td>
</tr>
<tr>
<td>Manual configuration to steer traffic</td>
<td></td>
</tr>
<tr>
<td>• One Application tier -&gt; Chain of L4-L7 service devices -&gt; To another application tier</td>
<td></td>
</tr>
<tr>
<td>Service graph representation</td>
<td></td>
</tr>
<tr>
<td>• Automatic binding of VLAN’s and contracts</td>
<td></td>
</tr>
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<td>Automatically steer traffic</td>
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![EPG Mode Diagram](image1)

EPG Mode (2 Contracts )

![Unmanaged Mode Diagram](image2)

Unmanaged Mode (1 Contract )
Why Choose Option A (EPG / Unmanaged)?

- ACI deployment in phases, L4-L7 integration at later time
- Attached F5 BIG-IP as you do today, continue with existing model
- No feature parity
- ACI goes into production tomorrow, just thought of L4-L7 today

What am I missing out not using ACI service insertion?

- L4-L7 Automation and Orchestration: agility and consistency
- Automatic service chaining and VLAN management
- Dynamic endpoints attach and detach
- End-to-end L2-L7 application requirements build into ACI policy
- Not taking full advantage of SDN programmability potential
- Business as usual: highly complex and error prone
F5 iWorkflow and Cisco ACI Integration Update
F5 and Cisco ACI Integration Models

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<table>
<thead>
<tr>
<th></th>
<th>Option B</th>
<th>Option C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F5 Static device package</strong></td>
<td>- Obtained from <a href="http://downloads.f5.com">http://downloads.f5.com</a></td>
<td>- Generated from the F5 iWorkflow</td>
</tr>
<tr>
<td></td>
<td>- <strong>Fixed</strong> set of BIG-IP parameters configurable</td>
<td>- <strong>Customized</strong> set of BIG-IP parameters configurable</td>
</tr>
<tr>
<td></td>
<td>- Does not support adding more feature functionality on BIG-IP than present in basic load balancing device package</td>
<td>- Through the iApps there is support to add as many features to the BIG-IP as the iApps can support</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>Not based on iApps templates</td>
<td></td>
<td>Based on iApps templates</td>
</tr>
<tr>
<td>LTM module support</td>
<td></td>
<td>LTM/ASM/AFM/APM modules can be supported</td>
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</table>
F5 iWorkflow 2.0.0 with Cisco ACI
Dynamic Device Package for ACI L4-L7 Service Insertion

• True alignment in Cisco ACI vision, where application requirements are built into ACI L4-L7 service functions

• Using F5 iWorkflow and iApps technologies, administrators can customize L4-L7 parameters exposed into ACI

• ACI L4-L7 service insertion benefits: dynamic VLAN management, automatic traffic redirection, dynamic endpoints attach/detach

• Highly programmable solution that focus on workflow automation and orchestration
iApps
Automated Deployments

“If you are going to do it twice, script it.

If it is going into production always test it.

Testing it means you are doing it at least twice.

So ALWAYS script it!”
What are iApps?

An iApps is an application-centric configuration template:

• User answers a few questions about deploying an application
• iApps translates answers into a set of configuration options
• iApps can touch almost all BIG-IP functionality
  • iRules, profiles, monitors, security policies, and much more ...
• There are many F5-provided iApps:
  • HTTP, Sharepoint, Exchange, VMware View, ...
• Users can build their own iApps
## SDAS: Application Based Networking Object Based Networking

<table>
<thead>
<tr>
<th>EXCHANGE SERVERS</th>
<th>POOLS</th>
<th>ORACLE MONITORS</th>
<th>PROFILES</th>
<th>POLICIES</th>
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<td>email VS</td>
<td>email Pool</td>
<td>OWA Monitor</td>
<td>ftp Profile</td>
<td>OWA Accel</td>
<td>HTTP Redirect</td>
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<td>vpn VS</td>
<td>vpn Pool</td>
<td>HTTP Monitor 1</td>
<td>HTTP Profile 1</td>
<td>SSO</td>
<td>OWA Append</td>
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<tr>
<td>intra VS</td>
<td>intra Pool</td>
<td>HTTP Monitor 1</td>
<td>HTTP Profile 2</td>
<td>intra sccess</td>
<td>Weak Encrypt Redirect</td>
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<tr>
<td>.com VS</td>
<td>.www VS</td>
<td>Oracle Monitor</td>
<td>ftp Profile</td>
<td>Oracle Monitor</td>
<td>Content Type Redirect</td>
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<td>POP3 Monitor</td>
<td>SSL Profile 1</td>
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<td>HTTP Throttle</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>SSL Profile 2</td>
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iWorkflow creates a catalog of iApp Templates
iWorkflow creates a catalog of iApp Templates (2)
iApps provide different values depending on Application and Organization.

**A Single View App**
Manage all application components in one place.

**An Easy Button**
Use F5-developed iApps to rapidly deploy popular applications with verified and supported configurations.

**An App Lifecycle Tool**
Unlike other template/wizard strategies, iApps are fully re-entrant, can manage the full lifecycle of the application.

**App Orchestration**
Standardize your unique application deployments using iApps, iControl and iWorkflow.

**Standards Enforcement**
iApps with strict updates, enforce standards, reducing training and operational risk.
iWorkflow in Practice
Deploy F5 iWorkflow Dynamic Device Package in ACI

1. Import iApps template into BIG-IP
2. BIG-IP expose iApps to iWorkflow during device discovery by iWorkflow
3. In iWorkflow Cloud Catalog, Admin create application template based on iApps
4. iWorkflow create custom device package based on Catalog
5. Admin import BIG-IQ device package to APIC
6. When graph is defined, server on BIG-IP

GRAPH INSTANCE THROUGH CONTRACT: HTTP-REDIRECT-1ARM-PUBLIC-CONTRACT

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F5 iWorkflow Device Package Supported Features

**Operational**
- Supports any BIG-IP physical and virtual form factor running
- Does not require any new module installation on the BIG-IP
- BIG-IP is licensed and OOB management configured prior to APIC integration
- Supports BIG-IP Active / Standby High Availability model per APIC logical device cluster

**Features**
- **Chassis Manager - vCMP (Virtualized Clustered Multiprocessing) HA**
  - Pre-requisite: vCMP guests already deployed
  - Allow user to specify unique vCMP host for each vCMP guest
  - vCMP guests - Active / Standby
- **Supports Dynamic endpoint attach and detach notifications**
- **True multi-tenancy**
  - Tenant + VRF on ACI => Partition + Route Domain on BIG-IP
  - Service Graph on ACI => Virtual Server on the BIG-IP
- **Device Package dynamically generated by iWorkflow**
- **Device Manager – F5 iWorkflow HA**
  - Pre-requisite: iWorkflow already in HA (Active/Active/Active)
  - Allow user to specify 3 iWorkflow through APIC
- **Support iWorkflow validated workflows using iApps**
iWorkflow HA – Device Manager – Workflow

1. Create Device Manager
   - Type

2. Create Device Manager

3. Associate Device Manager to Cluster inside LDev
Deploy F5 Virtual Server using iApps in ACI using iWorkflow

True Application Centric Approach align with Cisco ACI Vision

F5 iWorkflow can templatize F5 Virtual Server configuration using iApps based on Application specific requirements. F5 Virtual Server Template is shown in ACI as L4-L7 Service Function, only Tenant Editable parameters are exposed in ACI. Full Feature F5 Virtual Server deployed in BIG-IP thru ACI by iWorkflow that based on application specific requirements.
F5 supports TRUE Multiple Graph Multiple Tenancy

- Multiple Virtual Servers for different applications in the different BIG-IP partitions/APIC Tenants, sharing the same device

- Partition created by APIC inside BIG-IP is prefixed by the apic,"_" tenant-id to represent the partition in F5 (for ex : apic_5437)

- F5 demonstrate true multi-tenancy using different partitions for each tenant in APIC

- Each partition has been assigned individual route domain for L3 separation

- Virtual Servers created by APIC inside BIG-IP is prefixed by the apic,"_" tenant_id"_" graph (for ex : apic_5437_3456)
Solutions for an application world.
F5 iWorkflow Software Compatibility Matrix


<table>
<thead>
<tr>
<th>F5 iWorkflow 2.0.1</th>
<th>Compatibility</th>
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</thead>
<tbody>
<tr>
<td>F5 BIG-IP Release</td>
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<tr>
<td>12.1.1</td>
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Cisco APIC Release

<table>
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<th>Cisco APIC Release</th>
<th>Compatibility</th>
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<tbody>
<tr>
<td>1.2(3h)</td>
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