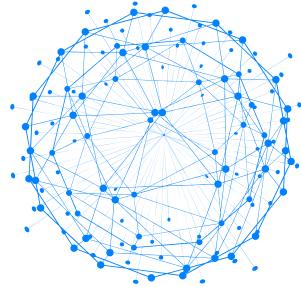


# 칼로리 줄어든 파스-타

- 경량화된 어플리케이션 플랫폼 -



2021. 02. 04.  
파스-타 어플리케이션 플랫폼 PL  
이문희 이사



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PaaS-TA 경량화 15

IV

PaaS-TA v5.5 23

포털  
( 사용자/운영자/APIs )

어플리케이션 플랫폼  
( cloudfoundry )

PaaS-TA-min

컨테이너 플랫폼  
( kubernetes )

단독배포

Edge배포

모니터링

MySQL

Cubrid

MongoDB

Redis

RabbitMQ

형상관리

파이프라인

로깅

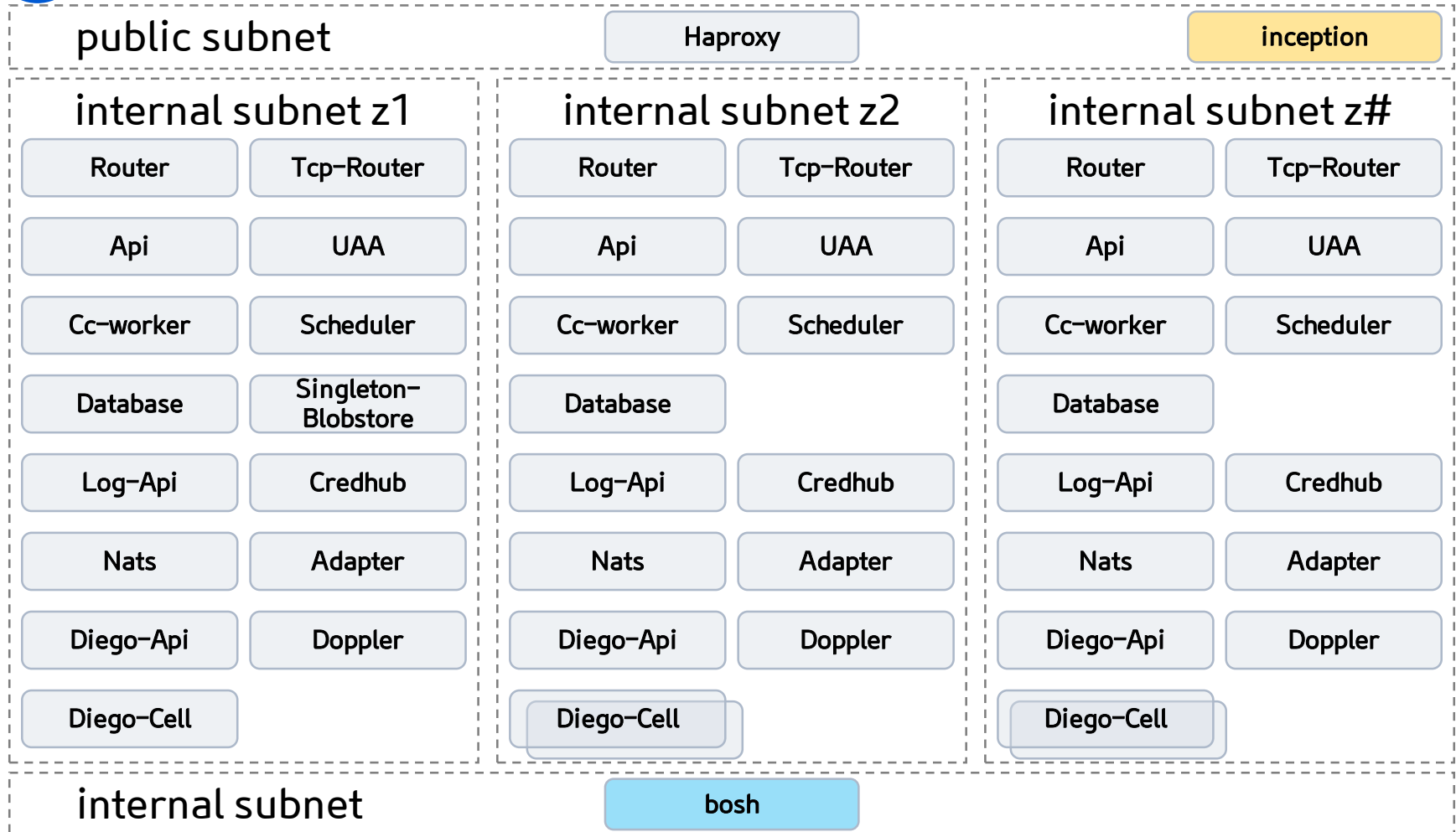
게이트웨이

라이프사이클 ...

# I . PaaS-TA 는 ...

## v5.0 based on cf-deployment v9.5

(2019년 12월 공개)



- Single VM 배포 경우, 최소 16 VMs 생성

I

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PaaS-TA 패치 및 업그레이드 .....

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## II. PaaS-TA 패치 및 업그레이드

NIA 한국지능정보사회진흥원

### v5.0.1 Deployment 방식으로 제공

(2020년 07월 공개)

#### 과거

 PaaS-TA

| 릴리즈 Note |     | 패키지 파일 다운로드 |                   | 소스코드 다운로드                                | 가이드        |
|----------|-----|-------------|-------------------|--|------------|
| 번호       | 구분  | 버전          | 이름                |  | 릴리즈 일자     |
| 4        | 패키지 | 5.0         | PaaSTA-Env        | <a href="#">MD5</a> <a href="#">SHA1</a> | 2019-12-11 |
| 3        | 패키지 | 5.0         | PaaSTA-Deployment | <a href="#">MD5</a> <a href="#">SHA1</a> | 2019-12-11 |
| 2        | 패키지 | 5.0         | PaaSTA-Release    | <a href="#">MD5</a> <a href="#">SHA1</a> | 2019-12-11 |
| 1        | 패키지 | 5.0         | PaaSTA-Stemcell   | <a href="#">MD5</a> <a href="#">SHA1</a> | 2019-12-11 |

- 오프라인 기준으로 PaaS-TA를 설치할 수 있도록 Deployment, Release, Stemcell, 설치자동화에 대한 파일들을 제공

#### 현재

##### service-deployment

● Shell 1 0 0 0 Updated on 17 Sep

##### paasta-deployment

PaaS-TA Deployment

● Shell 1 0 0 0 Updated 18 hours ago

##### monitoring-deployment

Monitoring-Deployment

● Go 0 0 0 0 Updated on 25 Aug

##### portal-deployment

Portal Deployment

● Shell 0 0 0 0 Updated 3 days ago

- 온라인 기준으로 PaaS-TA를 설치할 수 있도록 paasta, portal, service, monitoring 4개의 deployment와 common 레파지토리를 공개

## v5.0.1 개선사항

### paasta-deployment

PaaS-TA Deployment

● Shell 1 0 0 0 Updated 22 hours ago

### service-deployment

● Shell 1 0 0 0 Updated on 17 Sep

### monitoring-deployment

Monitoring-Deployment

● Go 0 0 0 0 Updated on 25 Aug

### portal-deployment

Portal Deployment

● Shell Apache-2.0 0 0 0 0 Updated 3 hours ago

### common

0 0 0 0 Updated 14 days ago

- ① paasta-deployment (bosh, 플랫폼) service-deployment monitoring-deployment portal-deployment (사용자/운영자 포털) 4개 Github 레파지토리 제공
- ② cf-deployment 와 유사하게 온라인 deployment 관리 및 배포
- ③ 오프라인 배포 시, use-compiled-releases-{var}.yaml 파일을 추가 하여 inception에 다운로드 한 release 를 활용하여 오프라인 배포 지원
- ④ common 레파지토리에 공통 변수 정의
- ⑤ 같은 의미의 -v 옵션 Key 이름 통일화
- ⑥ -i {iaas}-vars.yml 파일에 변경 가능한 옵션 값 정의
- ⑦ PaaS-TA 5.0.1 가이드 문서 공개

## v5.0.1 Guide 레파지토리 공개

### 과거

#### Guide-1.0-Spaghetti-

Document 관련 사항

👁 19 ☆ 22 ⓘ 0 🛠 0 Updated 21 days ago

#### Guide-2.0-Linguine-

👁 21 ☆ 19 ⓘ 0 🛠 0 Updated on 20 Nov 2018

#### Guide-3.0-Penne-

🔴 HTML 👁 15 ☆ 28 ⓘ 1 🛠 0 Updated on 10 Jul 2019

#### Guide-4.0-ROTELLE

Guide-4.0-ROTELLE

🟢 Shell 👁 15 ☆ 14 ⓘ 0 🛠 1 Updated on 9 Dec 2019

#### Guide-5.0-Ravioli

PaaS-TA v5.0 Ravioli

🟢 Shell 👁 15 ☆ 8 ⓘ 0 🛠 0 Updated 11 days ago

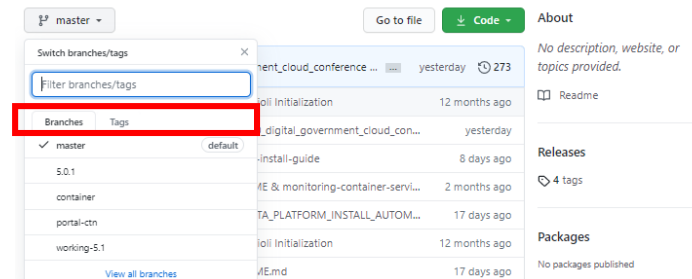
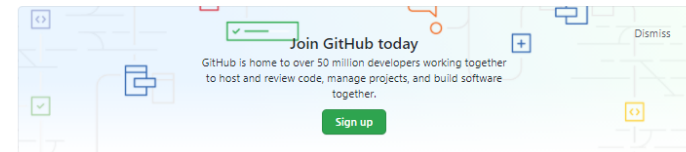
- PaaS-TA 버전 1.0 Spagetti 부터 버전별 Guide 레파지토리를 통해 설치 가이드 및 사용 가이드 제공

### 현재

#### PaaS-TA / Guide

👁 Watch 4 ☆ Star 0 🍴 Fork 0

<> Code ⓘ Issues 🔄 Pull requests 2 ⚙ Actions 📁 Projects ⓘ Security 📊 Insights



- 꾸준히 변경되고 발전하는 PaaS-TA 내용을 지속적으로 반영하고자 통합 Guide 레파지토리를 공개  
<https://github.com/PaaS-TA/Guide>

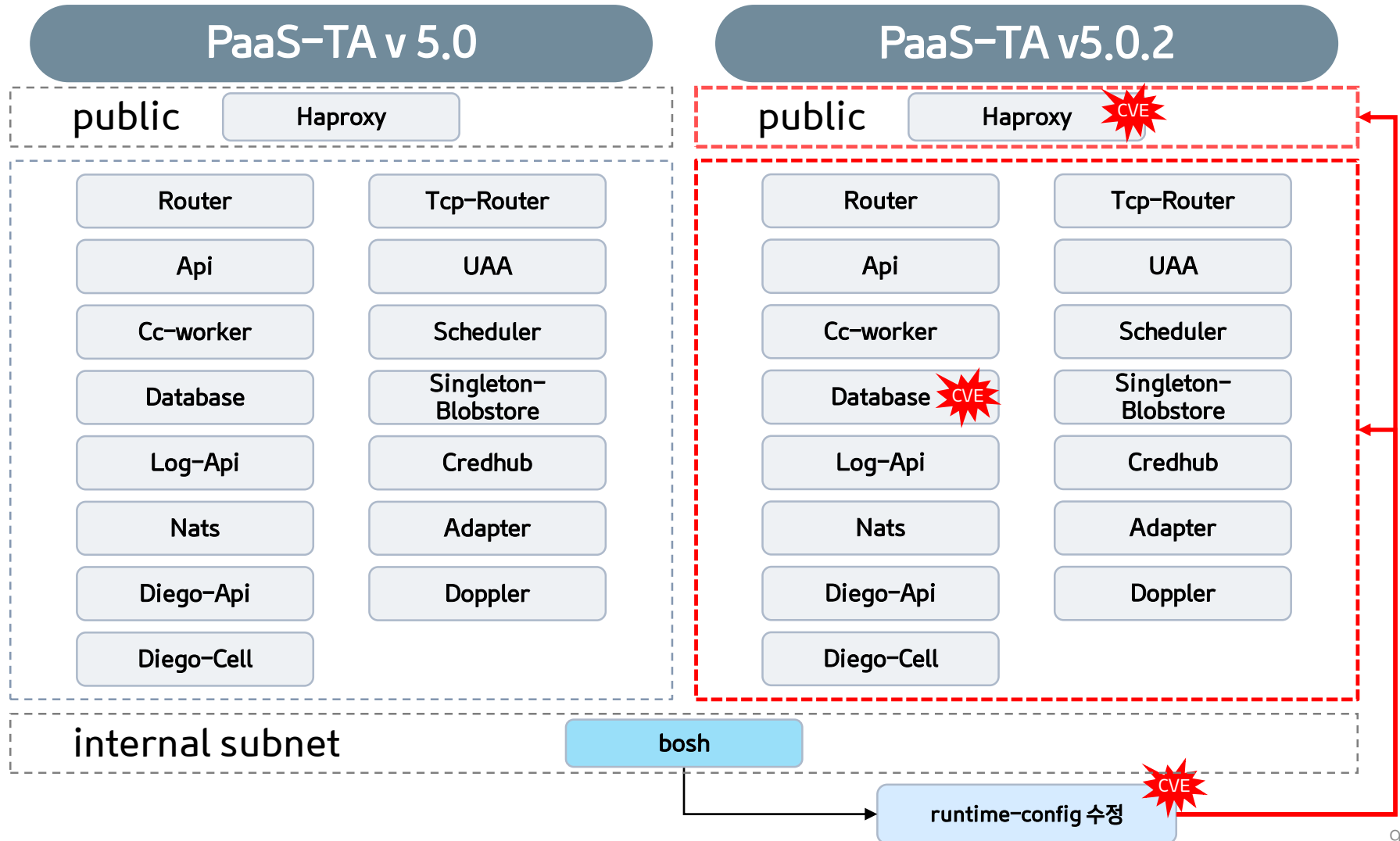


## II. PaaS-TA 패치 및 업그레이드

NIA 한국지능정보사회진흥원

### v5.0.2 보안 취약점(CVEs) 조치

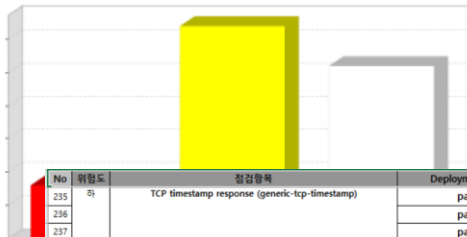
(2020년 09월 공개)



## PaaS-TA 5.0 보안 취약점 현황

### 심각도 별

심각도에 따른 취약점



| No  | 취약도 | 점검항목   | Deployment Name | Instance Name       | 클라우드마크-IP   |
|-----|-----|--|-----------------|---------------------|-------------|
| 235 | 하   | TCP timestamp response (generic-tcp-timestamp) | paasta          | nats                | 10.10.1.121 |
| 236 |     |  | paasta          | singleton-blobstore | 10.10.1.126 |
| 237 |     |  | paasta          | scheduler           | 10.10.1.129 |
| 238 |     |  | paasta          | router              | 10.10.1.130 |
| 239 |     |  | paasta          | tcp-router          | 10.10.1.131 |
| 240 |     |  | paasta          | doppler             | 10.10.1.132 |
| 241 |     |  | paasta          | log-api             | 10.10.1.135 |
| 242 |     |  | paasta          | diego-cell          | 10.10.1.137 |
| 243 |     |  | paasta          | diego-cell          | 10.10.1.138 |
| 244 |     |  | paasta          | diego-cell          | 10.10.1.140 |
| 245 |     |  | paasta          | diego-cell          | 10.10.1.141 |
| 246 |     |  | paasta          | diego-cell          | 10.10.1.144 |
| 247 |     |  | paasta          | adapter             | 10.10.2.122 |
| 248 |     |  | paasta          | uaa                 | 10.10.2.124 |
| 249 |     |  | paasta          | scheduler           | 10.10.2.127 |
| 250 |     |  | paasta          | router              | 10.10.2.128 |
| 251 |     |  | paasta          | doppler             | 10.10.2.130 |
| 252 |     |  | paasta          | log-api             | 10.10.2.133 |
| 253 |     |  | paasta          | diego-cell          | 10.10.2.136 |
| 254 |     |  | paasta          | diego-cell          | 10.10.2.137 |
| 255 |     |  | paasta          | diego-cell          | 10.10.2.138 |
| 256 |     |  | paasta          | diego-cell          | 10.10.2.139 |
| 257 |     |  | paasta          | diego-cell          | 10.10.2.142 |

- Single VM 배포 기준 파스-타 엔진 (애플리케이션 및 컨테이너 플랫폼), 포탈, 서비스 취약점 전체 104건 (상 5건, 중 57건, 하 42건) 발생

### Deployment 별

포탈 (26건)

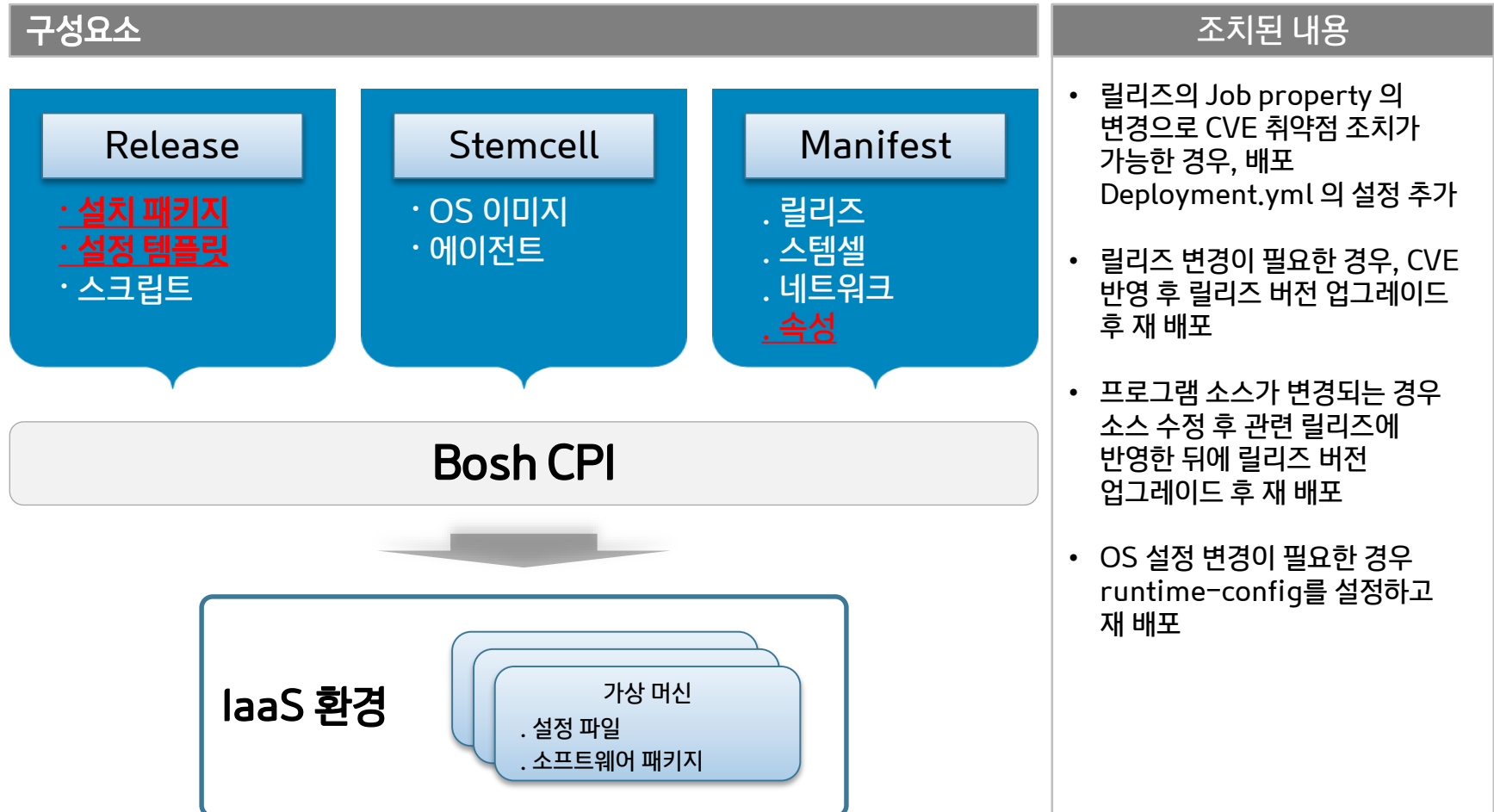
어플리케이션  
플랫폼(12건)

컨테이너  
플랫폼(10건)

14종 서비스(56건)

- Deployment 별 보안 취약점 포탈 26건, 어플리케이션 플랫폼 12건, 컨테이너 플랫폼 12건, 서비스 56건 발생

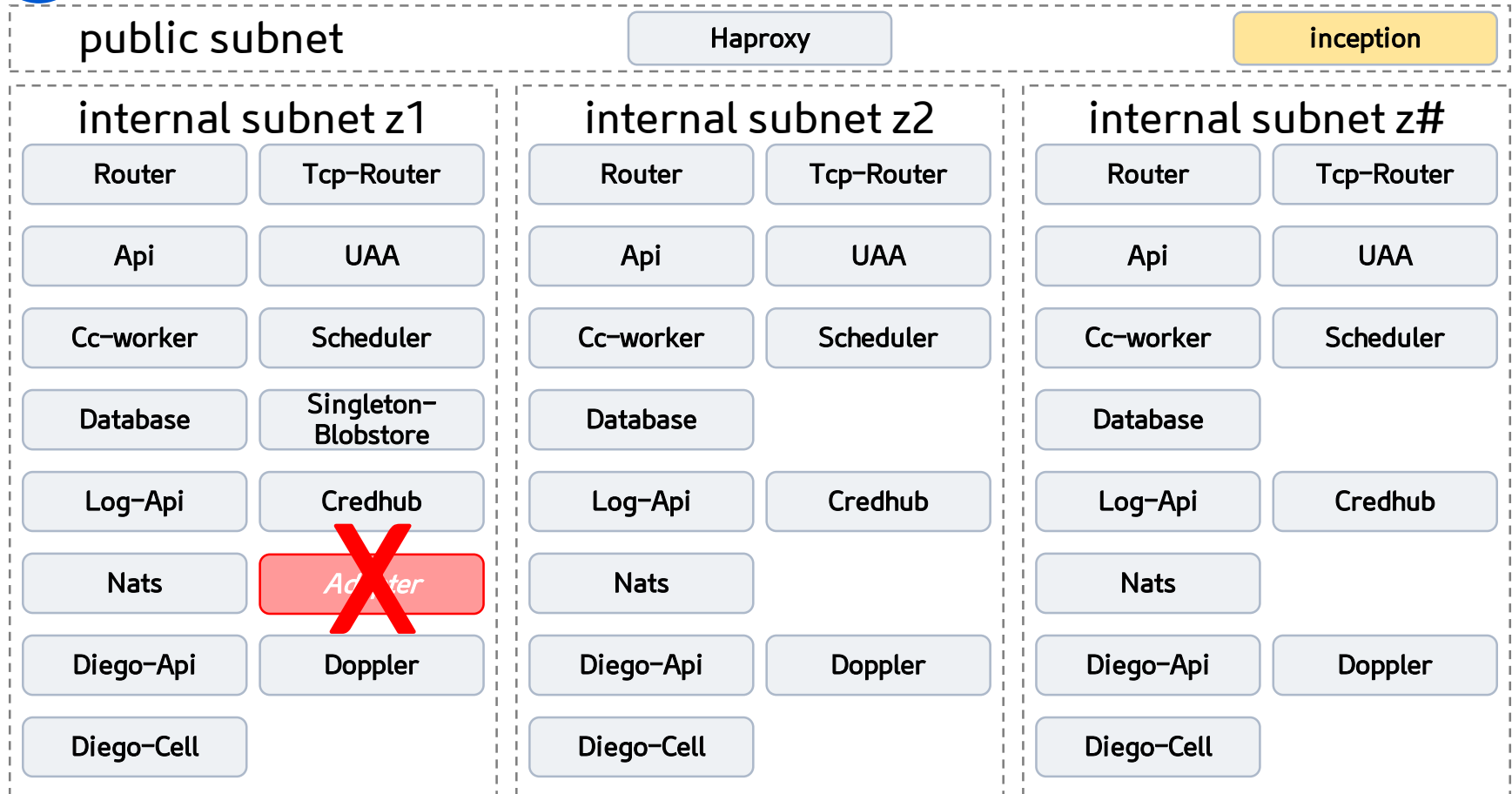
### PaaS-TA VMs 배포를 위한 구성요소 및 취약점 조치 방법



## II. PaaS-TA 패치 및 업그레이드

NIA 한국지능정보사회진흥원

 v5.1 based on cf-deployment v13.12 (2020년 11월 공개)



- Single VM 배포 경우, 최소 15 VMs 생성

## v5.1 release note

| Release           | Old Version                         | New Version                          |
|-------------------|-------------------------------------|--------------------------------------|
| cf-deployment     | v 9.5                               | v 13.12                              |
| bpm               | <a href="#">1.1.0</a>               | <a href="#">1.1.8</a>                |
| capi              | <a href="#">1.83.0</a>              | <a href="#">1.97.0</a>               |
| cf-cli            | <a href="#">1.16.0</a>              | <a href="#">1.28.0</a>               |
| cf-networking     | <a href="#">2.23.0</a>              | <a href="#">2.31.0</a>               |
| cf-smoke-tests    | <a href="#">40.0.112</a>            | <a href="#">41.0.0</a>               |
| cf-syslog-drain   | <a href="#">10.2</a>                |                                      |
| cflinuxfs3        | <a href="#">0.113.0</a>             | <a href="#">0.202.0</a>              |
| credhub           | <a href="#">2.4.0</a>               | <a href="#">2.8.0</a>                |
| diego             | <a href="#">2.34.0</a>              | <a href="#">2.47.0</a>               |
| garden-runc       | <a href="#">1.19.3</a>              | <a href="#">1.19.15</a>              |
| haproxy           | <a href="#">9.6.1</a>               | <a href="#">10.1.0</a>               |
| java_buildpack    | <a href="#">4.19.1</a>              | <a href="#">4.32.1</a>               |
| loggregator       | <a href="#">105.5</a>               | <a href="#">106.3.10</a>             |
| metrics-discovery |                                     | <a href="#">3.0.1</a>                |
| nats              | <a href="#">27</a>                  | <a href="#">34</a>                   |
| postgres          | <a href="#">38</a>                  | <a href="#">41</a>                   |
| pxc               | <a href="#">0.18.0</a>              | <a href="#">0.28.0</a>               |
| routing           | <a href="#">0.188.0</a>             | <a href="#">0.203.0</a>              |
| silk              | <a href="#">2.23.0</a>              | <a href="#">2.31.0</a>               |
| statsd-injector   | <a href="#">1.10.0</a>              | <a href="#">1.11.15</a>              |
| uaa               | <a href="#">72.0</a>                | <a href="#">74.23.0</a>              |
| loggregator-agent | <a href="#">3.9</a>                 | <a href="#">6.1.1</a>                |
| log-cache         | <a href="#">2.2.2</a>               | <a href="#">2.7.2</a>                |
| ubuntu-xenial     | 315.64<br>(Linux 4.15.0-54-generic) | 621.78<br>(Linux 4.15.0-112-generic) |

### ① Adapter VM 삭제

### ② CVE fixes

- \* HTTP TRACE Method Enabled (http-trace-method-enabled)
- \* CVE-2020-15586 (routing 0.203.0)

### ③ Java 14 Availability (java-buildpack 4.29)

### ④ CF CLI v7 support

(CAPI release 1.95.0 , CAPI V3 API v3.85.0)

- \* Rolling App Deployments
- \* Pushing an App with Multiple Processes
- \* Pushing Apps with Sidecar Processes

### ⑤ 메트릭과 로그 수집을 위한 에이전트가 각각 수행되도록 addon jobs가 추가

```
uaa/a4d27316-1c65-4532-b949-75bb3b126a29:/var/vcap# monit summary
The Monit daemon 5.2.5 uptime: 2d 21h 44m

Process 'uaa'                                running
Process 'route_registrar'                   running
Process 'statsd_injector'                   running
Process 'loggregator_agent'                 running
Process 'loggr-forwarder-agent'             running
Process 'loggr-syslog-agent'                 running
Process 'prom_scraper'                      running
Process 'metrics-discovery-registrar'       running
Process 'metrics-agent'                     running
Process 'bosh-dns'                          running
Process 'bosh-dns-resolvconf'               running
Process 'bosh-dns-healthcheck'              running
System 'system_localhost'                  running
```

I

PaaS-TA 는 ...

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II

PaaS-TA 패치 및 업그레이드

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III

PaaS-TA 경량화

15

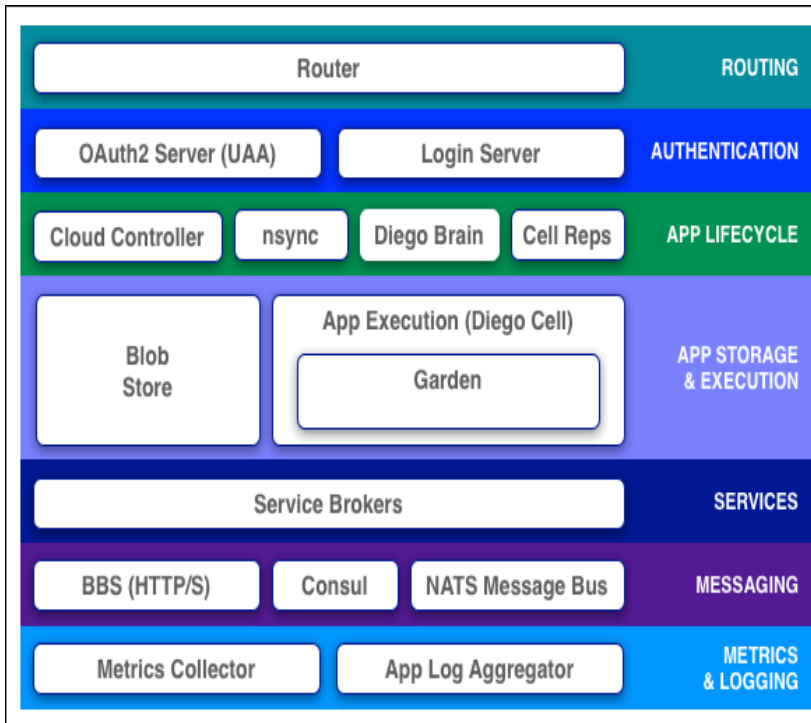
IV

PaaS-TA v5.5

23

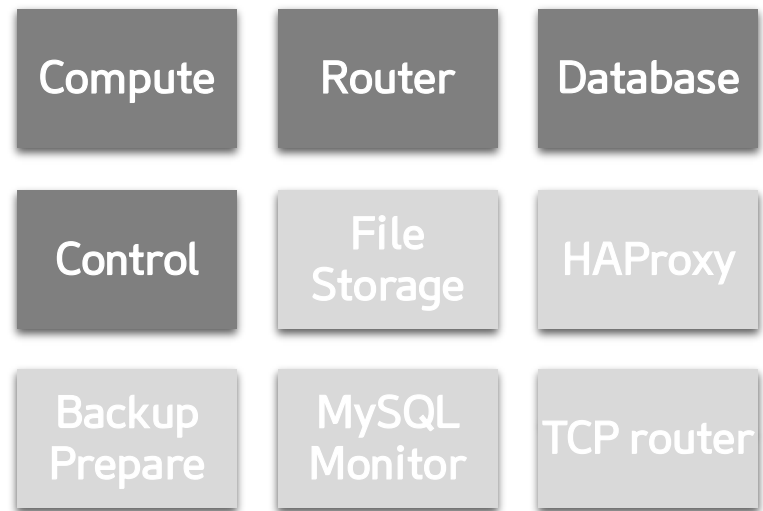
## ☁ 어플리케이션 플랫폼 경량 모델을 통해 PaaS-TA 도입 확산

### PaaS-TA 기본



- Single VM 배포 경우, 최소 15 VMs 필요로 하므로 IaaS 리소스 부담

### PaaS-TA min

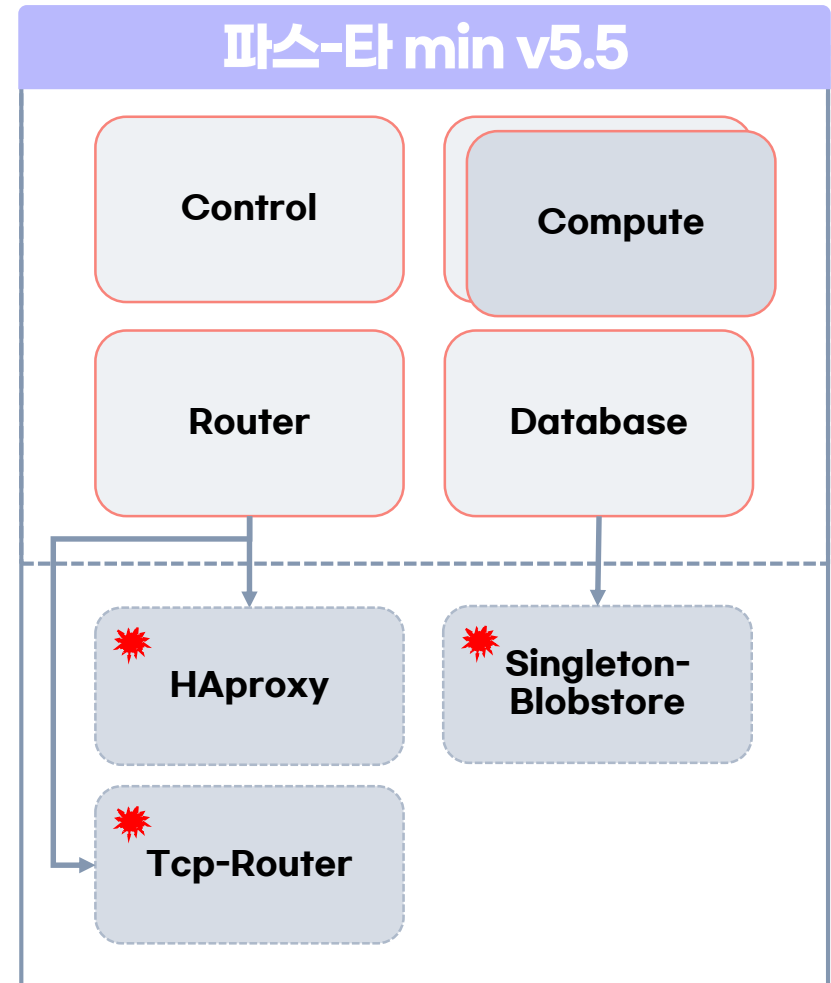
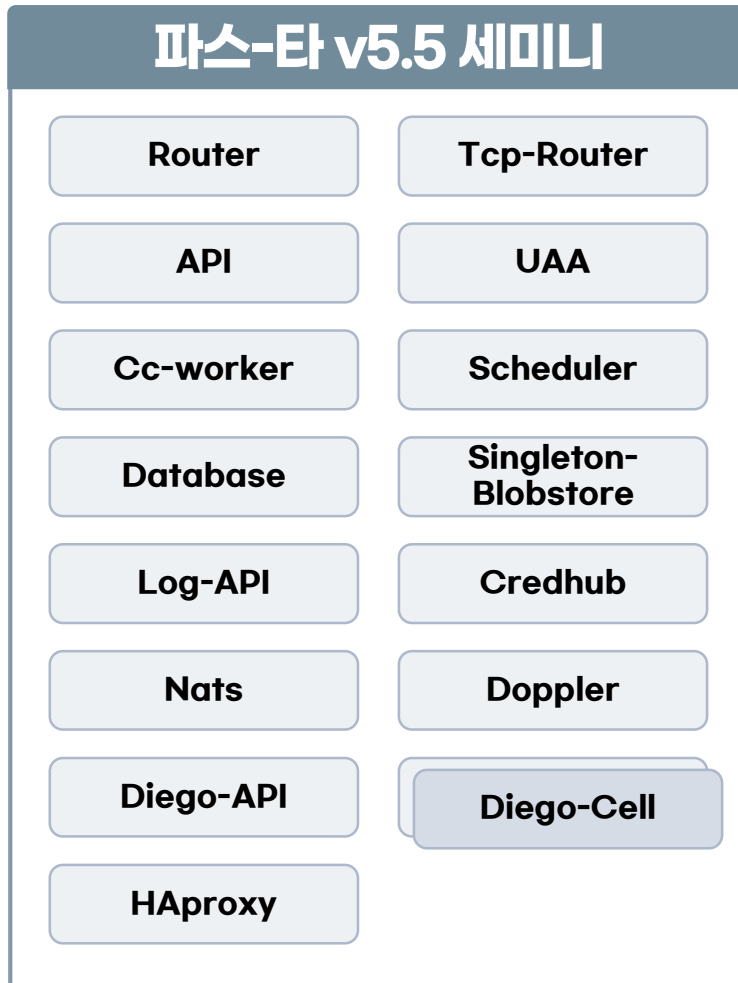


※ P\*\*\*\*\* small footprint

- PaaS-TA 경량 모델 제안으로 IaaS 리소스 부담 감소
- 경량 모델을 통해 PaaS-TA 도입 확산

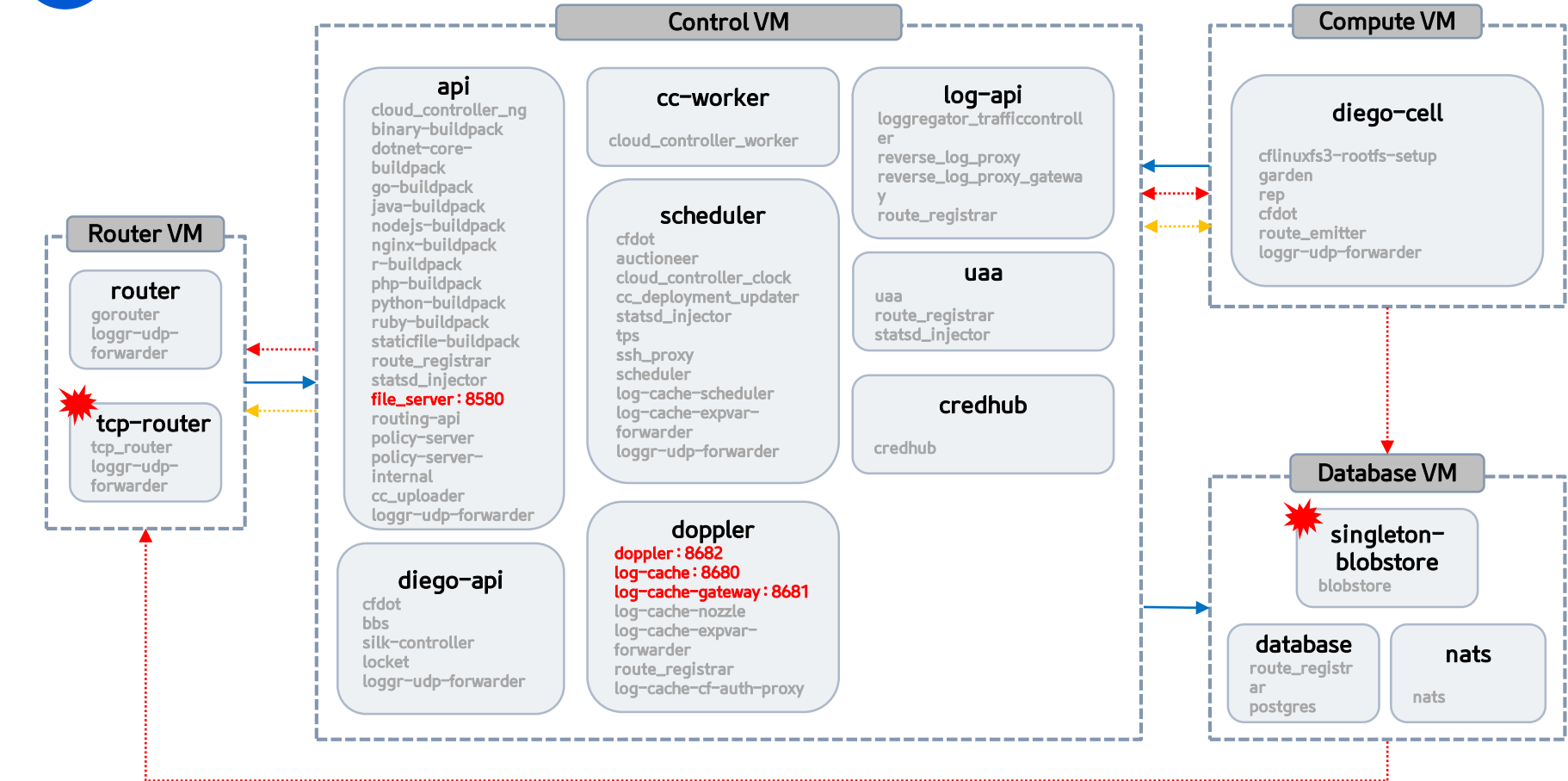
# Ⅲ. PaaS-TA 경량화 (2/7)

 PaaS-TA 배포 15VMs → PaaS-TA-min 4VMs(또는 7VMs)





## ☁ 어플리케이션 플랫폼 경량 모델 상세

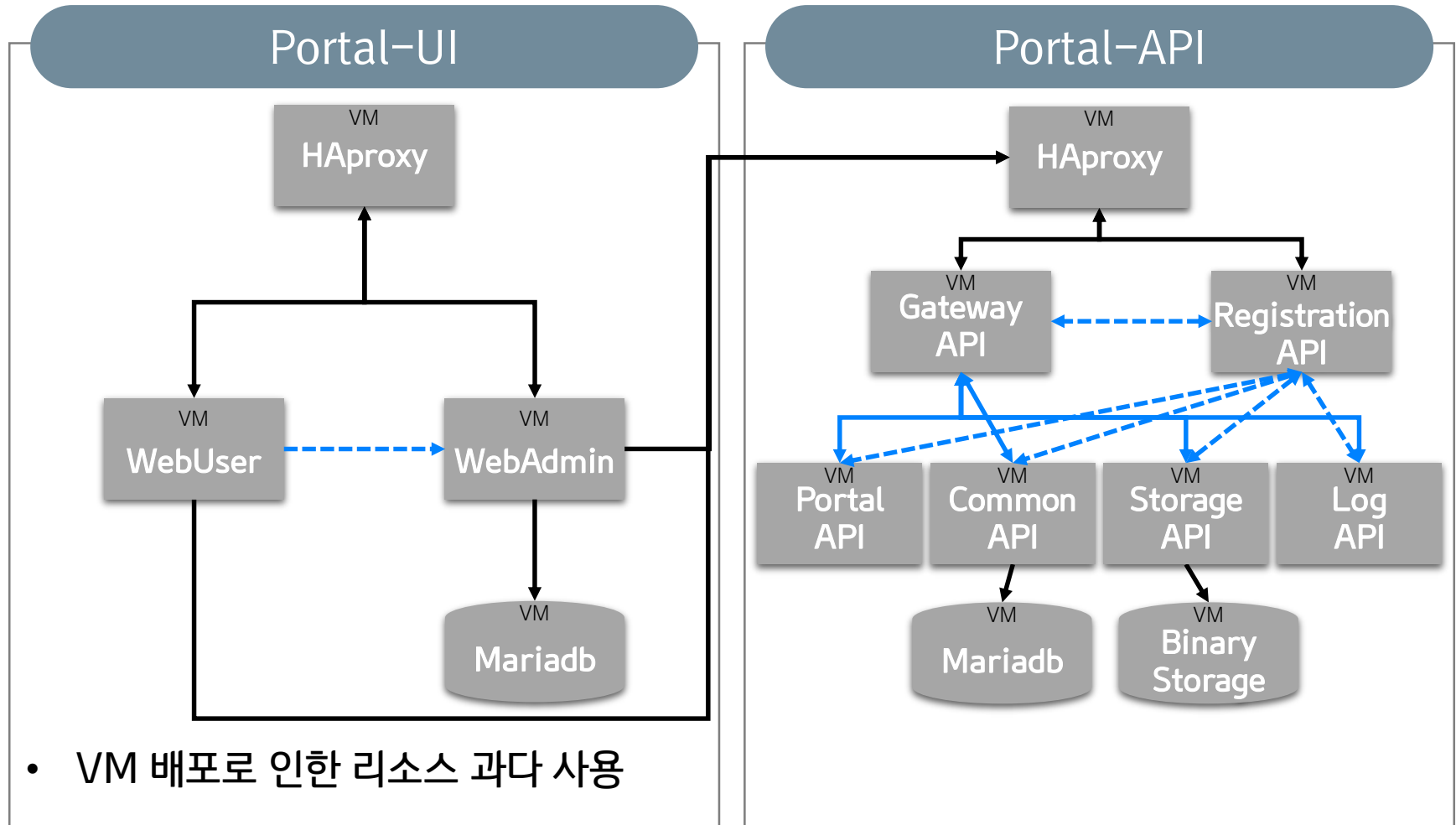


### \* 제약조건

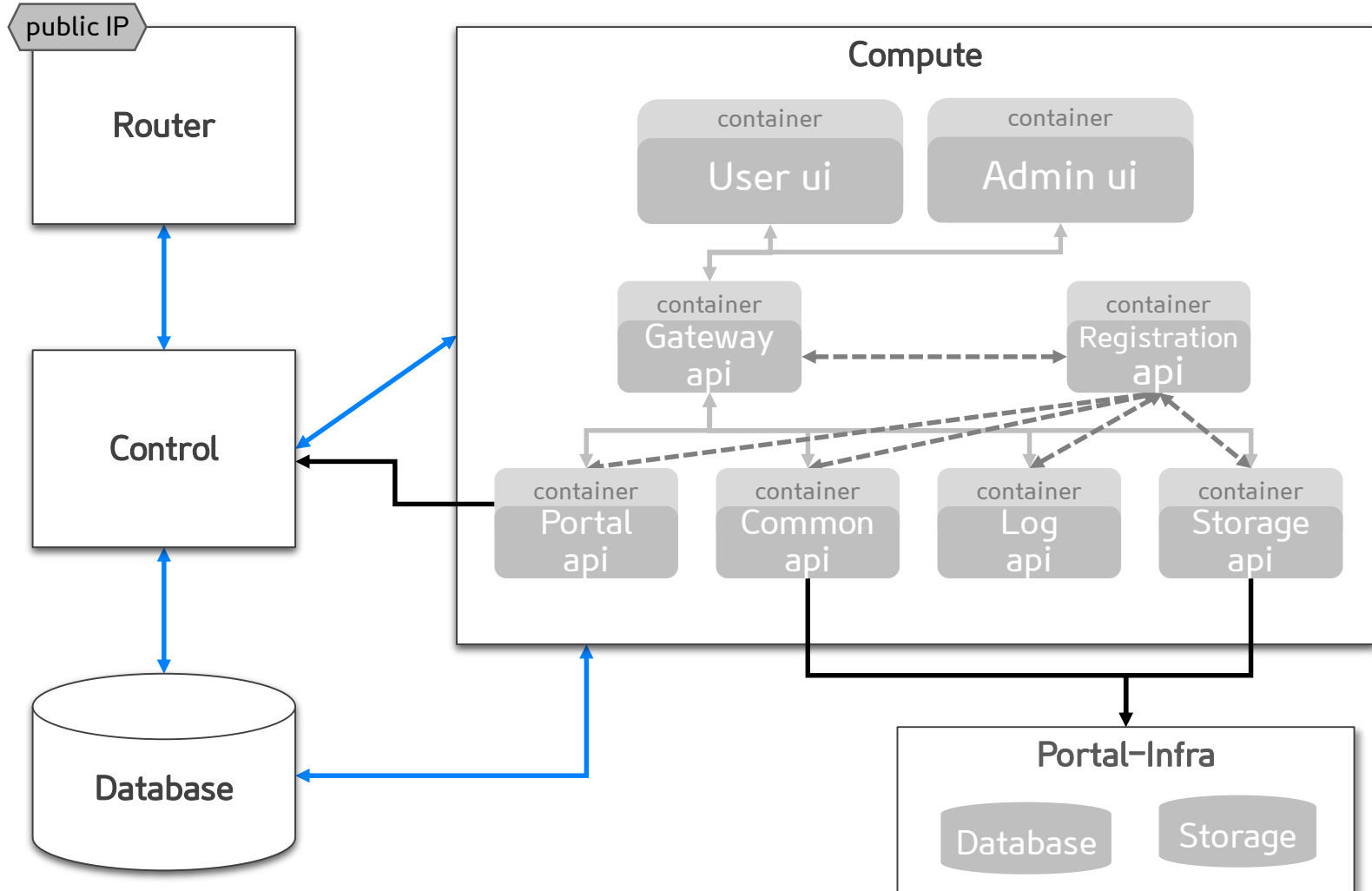
**Compute VM 10대 미만 2,500 어플리케이션 인스턴스**  
**Control 의 vm\_type 은 최소 "vCPU 4 memory 16GB"**



## ☁ 멀티 어플리케이션 플랫폼 지원을 위한 아키텍처



## ☁ 어플리케이션 플랫폼 (single배포 15) & 포털 (13) → 5 VMs



# Ⅲ. PaaS-TA 경량화 (6/7)

NIA 한국지능정보사회진흥원



## 플레이파크 배포 예) 어플리케이션 플랫폼 35VMs + 포털 13VMs

Deployment 'paasta'

| Instance  | Process State | AZ | IPs          | VM CID                                  | VM Type            | Active |
|---|---------------|----|--------------|---|--------------------|--------|
| adapter/38d5ea18-e842-46ad-a8ff-44b0b57f2ec2    | running       | z1 | 10.200.8.73  | vm-865f0347-6883-4af1-a5a5-cdd28442e542 | small              | true   |
| adapter/e4321fee-10ed-4bb0-b9f1-e176bdcf96a0    | running       | z1 | 10.200.8.94  | vm-13f2a1e4-6087-4e81-a10a-7d21ab7ae764 | small              | true   |
| api/9a2c2762-91b0-4b3e-86f0-9301d7c32db8        | running       | z1 | 10.200.8.78  | vm-53dd3a50-dd8a-4e64-9662-4746733ba0a0 | small              | true   |
| api/db53a193-1dd8-448b-8f52-f26341800c5b        | running       | z1 | 10.200.8.98  | vm-823bafa6-0dde-4caf-b090-1fddcfafb58f | small              | true   |
| cc-worker/245b0e56-2e94-4d4a-9f53-c05983e6662d  | running       | z1 | 10.200.8.79  | vm-e8d7cb72-f727-4c56-890b-17ca92dbc513 | small              | true   |
| cc-worker/32a7bb56-9a50-4bf9-80fb-79298c151723  | running       | z1 | 10.200.8.99  | vm-3f3b11cf-14f8-418a-b850-7084caaf90d2 | small              | true   |
| credhub/15903b13-fd73-407a-826e-713dd309f5dd    | running       | z1 | 10.200.8.91  | vm-22324a14-7869-4d7d-9cdf-c908296a2dd8 | small              | true   |
| credhub/23ff3f0a-b8f9-4cf5-bdb2-9c68565a847d    | running       | z1 | 10.200.8.106 | vm-d7e36ae5-2db5-4aa9-ab1b-309497713159 | small              | true   |
| database/69e23a87-b626-4ca7-9170-e17ac347f44e   | running       | z1 | 10.200.8.95  | vm-679093c4-9cc9-42fd-a9d6-184a3c198a1f | small              | true   |
| database/dc404dae-de5d-436e-81a3-e4c9358368ba   | stopped       | z1 | 10.200.8.74  | vm-a91b5680-c790-47df-ab0a-aabf4b76bdfc | small              | true   |
| diego-api/5e3cf057-4c1a-4132-a020-ae601e94fe89  | running       | z1 | 10.200.8.75  | vm-a2076e41-c4b0-4632-90b7-b57ebb73ec0c | small              | true   |
| diego-api/5eccf56d-1e9a-4de3-b08f-f7b76e1e1a8f  | running       | z1 | 10.200.8.96  | vm-8a878818-c7e0-4744-abd7-362022d5f8f0 | small              | true   |
| diego-cell/0e885379-cc28-4b14-9abc-81903de9767e | running       | z1 | 10.200.8.85  | vm-f97f85dc-fc66-4423-a02d-6f005e040052 | small-highmem-16GB | true   |
| diego-cell/159c149b-5434-4589-ad91-fd688901c84b | running       | z1 | 10.200.8.86  | vm-12e28dd1-e178-4da3-886f-6c729ef93a68 | small-highmem-16GB | true   |
| diego-cell/26e1e108-2b72-4faf-96ce-cee937011363 | running       | z1 | 10.200.8.87  | vm-c779f110-5bc4-48d7-b925-59caadc5ae9  | small-highmem-16GB | true   |
| diego-cell/47ac8667-19ac-416f-96ba-1b4ad5ea7871 | running       | z1 | 10.200.8.88  | vm-e5294b6c-3812-4f62-804a-1aca855a63bb | small-highmem-16GB | true   |

Deployment 'paasta-portal-api'

| Instance                                      | Process State | AZ | IPs            | VM CID                                   | VM Type       | Active |
|---|---------------|----|----------------|--|---------------|--------|
| doppler/8cf                                   |               |    |                |  |               |        |
| doppler/b91                                   |               |    |                |  |               |        |
| doppler/bf3                                   | running       | z1 | 10.200.8.113   | vm-20dd0be2-f4df-441d-a16c-faae7b41dd5d  | portal_small  | true   |
| doppler/ecc                                   | running       | z1 | 10.200.8.112   | vm-dcaf21ff-cb8e-45eb-9a77-b7f1c9814e87  | small         | true   |
| haproxy/509                                   |               |    | 10.200.111.214 |  |               |        |
| mariadb/5dcdcfcb0-7c46-4679-941c-e5ca5ba50328 | running       | z1 | 10.200.8.111   | vm-3abb020a-1099-4b8d-9320-c596ccbacc5fa | portal_small  | true   |
| log-api/f25                                   | running       | z1 | 10.200.8.116   | vm-c478c11e-be37-4615-80e5-223e10d9fa96  | portal_medium | true   |
| log-api/f9f                                   | running       | z1 | 10.200.8.117   | vm-90a93d2f-583a-4c83-b18d-f7fb956d0615  | portal_small  | true   |
| nats/61ab82                                   | running       | z1 | 10.200.8.114   | vm-b7f6b6d1-a57c-479c-aef3-1570f7fec47d  | portal_small  | true   |
| nats/f9d9b0                                   | running       | z1 | 10.200.8.119   | vm-bd46c630-9372-4ccf-99b4-22be2bc5d293  | portal_small  | true   |
| router/13f7                                   | running       | z1 | 10.200.8.115   | vm-bf14dedd-b6d0-4e4f-9840-0d40c86e4320  | portal_small  | true   |
| router/79b8                                   | running       | z1 | 10.200.8.118   | vm-72b33906-4d9c-4868-9353-464f85201398  | portal_small  | true   |

35 vms

Deployment 'paasta-portal-ui'

| Instance   | Process State | AZ | IPs            | VM CID                                  | VM Type | Active |
|--|---------------|----|----------------|---|---------|--------|
| tcp-router/  |               |    |                |   |         |        |
| tcp-router/  |               |    |                |   |         |        |
| uaa/6c9a5ad  | running       | z1 | 10.200.8.108   | vm-cdfc1d59-5163-474c-be94-3104d6a97a7d | small   | true   |
| uaa/735bf4c  |               |    | 10.200.111.215 |   |         |        |
| mariadb/6e8d3c23-751b-46b3-8998-ed426cfa86a8                 | running       | z1 | 10.200.8.107   | vm-423e0c35-4f09-46da-81ed-dcde656ea361 | small   | true   |
| paas-ta-portal-webadmin/d79867bd-8aea-40f3-9bfa-5c7dca91417b | running       | z1 | 10.200.8.109   | vm-02376dcb-852a-49fc-a48f-4a78bb00be50 | small   | true   |
| paas-ta-portal-webuser/3cbfcce04-a0c4-4d84-b3ca-c23438348f7d | running       | z1 | 10.200.8.110   | vm-8071b33d-f8de-4508-8d14-d2970ac7b0d5 | small   | true   |

4 vms

# Ⅲ. PaaS-TA 경량화 (7/7)

## 경량 모델 배포 예) 어플리케이션 플랫폼 4VMs + 포털 1VM + 8 컨테이너

Deployment 'paasta'

| Instance                                      | Process | State | AZ | IPs            | VM CID              | VM Type            | Active |
|---|---------|-------|----|----------------|---------------------|--------------------|--------|
| compute/29bcfd45-9509-4cb0-b7f2-19622c101a6f  | running |       | z1 | 10.0.21.156    | i-08deac3c504514722 | small-highmem-16GB | true   |
| control/30f50250-3c34-4371-816e-6982f7ace8be  | running |       | z1 | 10.0.21.153    | i-087b9d21d8de8e427 | small-highmem-16GB | true   |
| database/b1e257a9-1d1a-426d-8dc9-a9d465a1c0d7 | running |       | z1 | 10.0.21.151    | i-011e3d13fddd44452 | small              | true   |
| router/8ac05a34-5bad-430d-96ed-f07a0a324041   | running |       | z1 | 10.0.21.154    | i-00615cb73810d32be | minimal            | true   |
|   |         |       |    | 13.124.185.107 |                     |                    |        |

4 vms

Succeeded

Deployment 'portal-container-infra'

| Instance                                   | Process | State | AZ | IPs         | VM CID              | VM Type | Active | Stemcell                    |
|--|---------|-------|----|-------------|---------------------|---------|--------|-----------------------------|
| infra/7b199a17-5583-41ca-b4f4-7e56b6d9ef8c | running |       | z4 | 10.0.33.203 | i-0d66034cbf31784dd | large   | true   | bosh-aws-xen-hvm-ubuntu-xen |

1 vms

\$ cf apps

Getting apps in org system / space dev as admin...

OK

| name                | requested | state | instances | memory | disk | urls                                      |
|---------------------|-----------|-------|-----------|--------|------|---|
| portal-registration | started   |       | 1/1       | 1G     | 1G   | portal-registration.13.124.185.107.nip.io |
| portal-api          | started   |       | 1/1       | 2G     | 1G   | portal-api.13.124.185.107.nip.io          |
| portal-gateway      | started   |       | 1/1       | 1G     | 1G   | portal-gateway.13.124.185.107.nip.io      |
| portal-common-api   | started   |       | 1/1       | 1G     | 1G   | portal-common-api.13.124.185.107.nip.io   |
| portal-log-api      | started   |       | 1/1       | 1G     | 1G   | portal-log-api.13.124.185.107.nip.io      |
| portal-storage-api  | started   |       | 1/1       | 1G     | 1G   | portal-storage-api.13.124.185.107.nip.io  |
| portal-web-admin    | started   |       | 1/1       | 1G     | 1G   | portal-web-admin.13.124.185.107.nip.io    |
| portal-web-user     | started   |       | 1/1       | 1G     | 1G   | portal-web-user.13.124.185.107.nip.io     |

I

PaaS-TA 는 ...

3

II

PaaS-TA 패치 및 업그레이드

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III

PaaS-TA 경량화

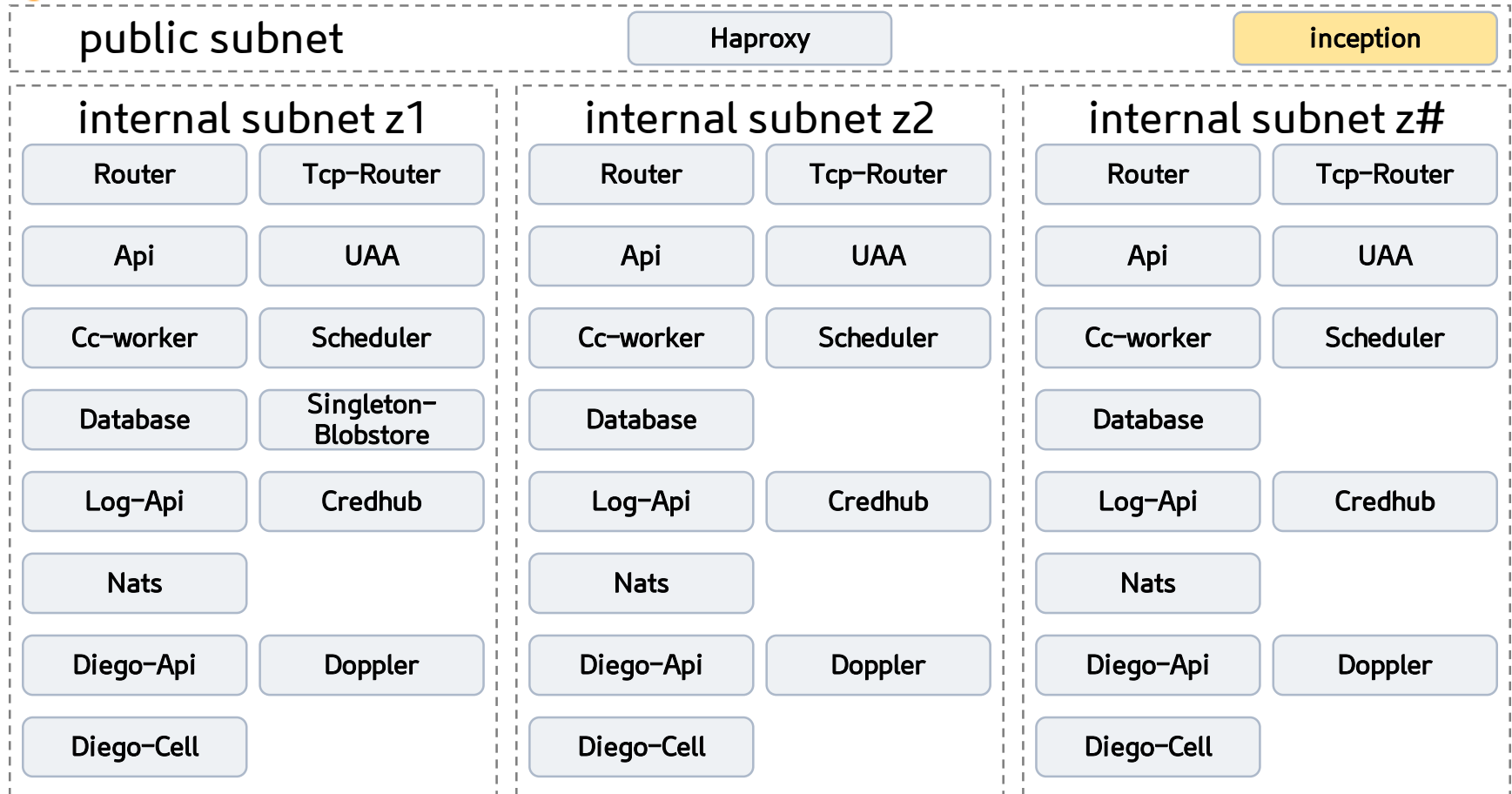
15

IV

PaaS-TA v5.5

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## SEMINI based on cf-deployment v13.19 (2021년 02월 공개)



- Single VM 배포 경우, 최소 15 VMs 생성

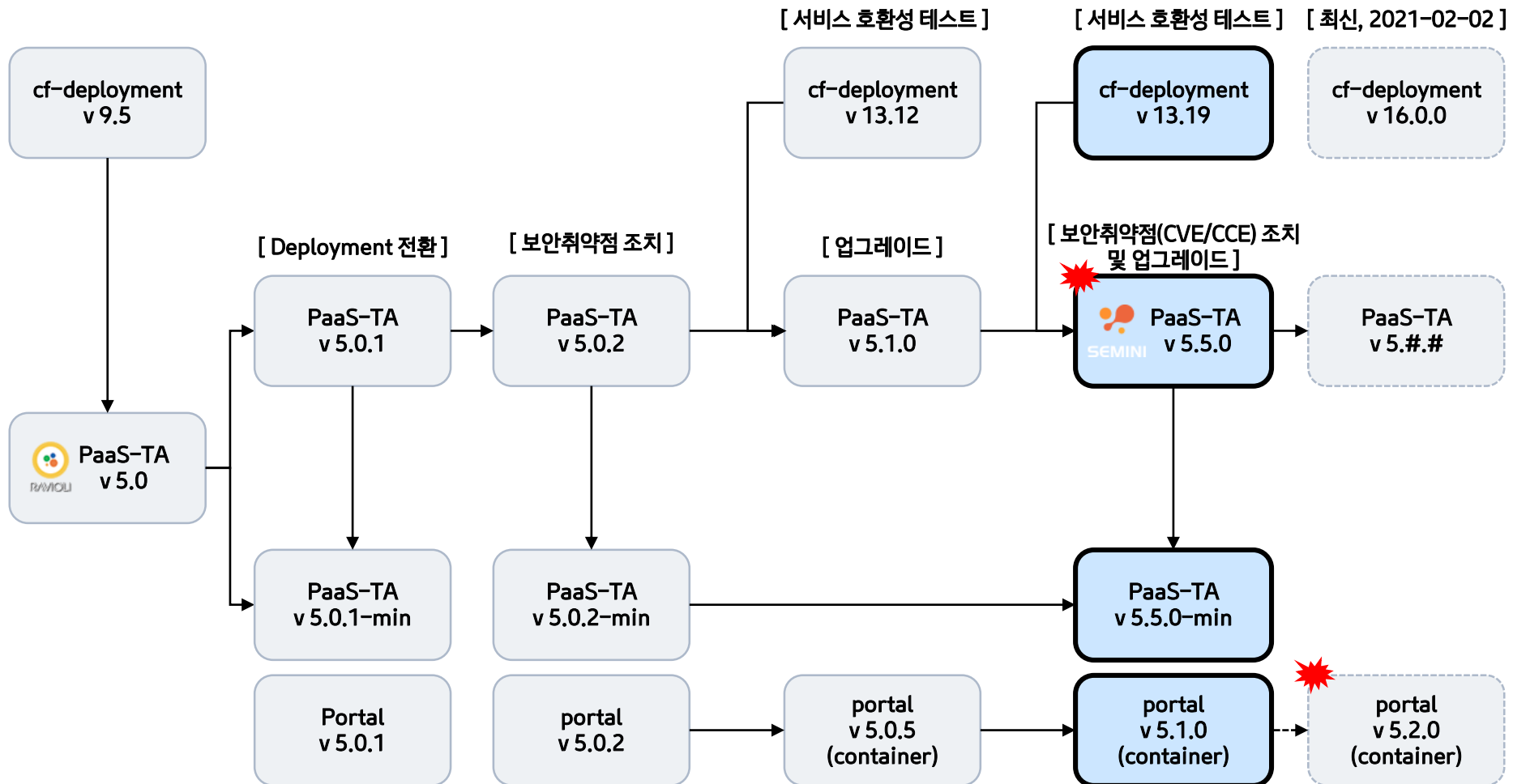
## release note

| Release           | Old Version                            | New Version                                    |
|-------------------|--|--|
| bosh-deployment   | bosh-270.2.0<br>(ubuntu-xenial-315.64) | bosh-271.2.0-PaaS-TA<br>(ubuntu-xenial-621.93) |
| cf-deployment     | v 13.12                                | v 13.19  |
| bpm               | <a href="#">1.1.8</a>                  | <a href="#">1.1.9</a>                          |
| capi              | <a href="#">1.97.0</a>                 | <a href="#">1.98.0-PaaS-TA</a>                 |
| cf-cli            | <a href="#">1.28.0</a>                 | <a href="#">1.29.0</a>                         |
| cf-networking     | <a href="#">2.31.0</a>                 | <a href="#">2.33.0-PaaS-TA</a>                 |
| cf-smoke-tests    | <a href="#">41.0.0</a>                 | <a href="#">41.0.1</a>                         |
| cflinuxfs3        | <a href="#">0.202.0</a>                | <a href="#">0.204.0</a>                        |
| credhub           | <a href="#">2.8.0</a>                  | <a href="#">2.8.0</a>                          |
| diego             | <a href="#">2.47.0</a>                 | <a href="#">2.48.0-PaaS-TA</a>                 |
| garden-runc       | <a href="#">1.19.15</a>                | <a href="#">1.19.16</a>                        |
| haproxy           | <a href="#">10.1.0</a>                 | <a href="#">10.1.0</a>                         |
| java_buildpack    | <a href="#">4.32.1</a>                 | <a href="#">4.32.1</a>                         |
| loggregator       | <a href="#">106.3.10</a>               | <a href="#">106.3.10</a>                       |
| metrics-discovery | <a href="#">3.0.1</a>                  | <a href="#">3.0.1</a>                          |
| nats              | <a href="#">34</a>                     | <a href="#">34</a>                             |
| postgres          | <a href="#">41</a>                     | <a href="#">42</a>                             |
| pxc               | <a href="#">0.28.0</a>                 | <a href="#">0.29.0</a>                         |
| routing           | <a href="#">0.203.0</a>                | <a href="#">0.207.0-PaaS-TA</a>                |
| silk              | <a href="#">2.31.0</a>                 | <a href="#">2.33.0-PaaS-TA</a>                 |
| statsd-injector   | <a href="#">1.11.15</a>                | <a href="#">1.11.15</a>                        |
| uaa               | <a href="#">74.23.0</a>                | <a href="#">74.29.0-PaaS-TA</a>                |
| log-cache         | <a href="#">2.7.2</a>                  | <a href="#">2.8.0</a>                          |
| ubuntu-xenial     | 621.78<br>(Linux 4.15.0-112-generic)   | 621.94<br>(Linux 4.15.0-124-generic)           |

- ① bosh Director 버전 및 stemcell 업그레이드
- ② CVE fixes  
\* CVE-2020-5416.  
( Improve websocket error handling )
- ③ CCE fixes  
\* KISA 시스템 취약점 점검 v4.1 조치  
\* 점검 대상 시스템  
Linux, Apache/Tomcat, MySQL, Postgres 등
- ④ 보안취약점(CVE) 및 시스템취약점(CCE)가 조치된 다수의 PaaS-TA 릴리즈 적용



## ☁ 어플리케이션 플랫폼 업그레이드 및 서비스 호환성 테스트



# End of Document