Pulumi – sovelluspalvelinympäristö koodina

DIP-konferenssi

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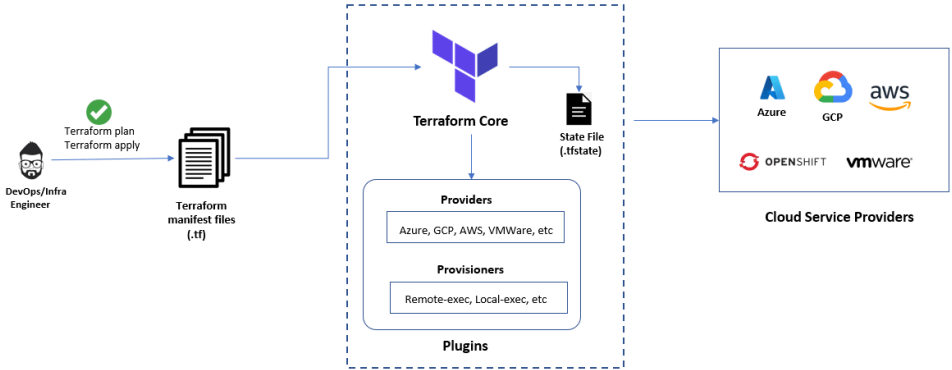
Infrastructure as Code

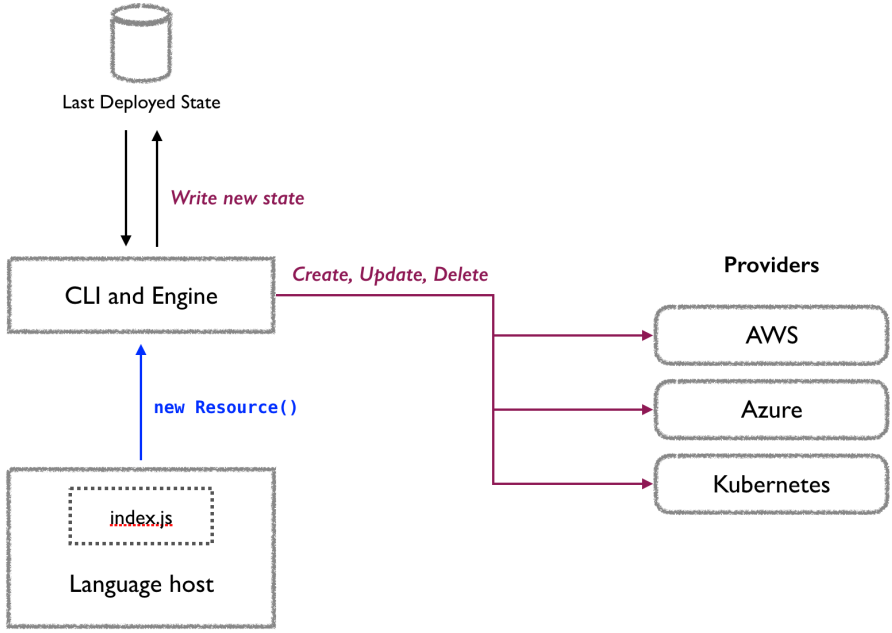
Terraform language syntax

```
resource "vsphere_virtual_machine" "vm" {
  name             = "foo"
  resource_pool_id = data.vsphere_compute_cluster.cluster.resource_pool_id
  datastore_id     = data.vsphere_datastore.datastore.id
  num_cpus         = 1
  memory           = 1024
  guest_id         = "other3xLinux64Guest"
  network_interface {
    network_id = data.vsphere_network.network.id
  }
  disk {
    label = "disk0"
    size  = 20
  }
}
```

Terraform Architecture



With Pulumi


Last Deployed State
Write new state
CLI and Engine
Create, Update, Delete
Providers
AWS
Azure
Kubernetes
new Resource()
index.js
Language host

Pulumi resource in Python

```
virtual_machine = vsphere.VirtualMachine("vm",
    name="foo",
    resource_pool_id="your_resource_pool_id",
    datastore_id="your_datastore_id",
    num_cpus=1,
    memory=1024,
    guest_id="other3xLinux64Guest",
    network_interfaces=[vsphere.VirtualMachineNetworkInterfaceArgs(
        network_id="your_network_id",
    )],
    disks=[vsphere.VirtualMachineDiskArgs(
        label="disk0",
        size=20,
    )],
)
```

Pulumi resource in YAML

```yaml
resources:
  vm:
    type: vsphere:index/virtualMachine:VirtualMachine
    properties:
      name: foo
      resourcePoolId: ${resourcePool.id}
      datastoreId: ${datastore.id}
      numCpus: 1
      memory: 1024
      guestId: other3xLinux64Guest
      networkInterfaces:
        - networkId: ${network.id}
      disks:
        - label: disk0
          size: 20
```

Pulumi automation API

```
### Create and deploy stack with dynamic Pulumi program
pulumi.automation.create_or_select_stack(
    stack_name="test",
    project_name="proxy",
    program=..,
    opts=pulumi.automation.localworkspaceoptions(
        project_settings=pulumi.automation.projectsettings(
            name="proxy"
            runtime="python",
            backend=...
        ),
        secrets_provider=...
    ),
).up() ### Go!
```

Accessing asynchronous outputs

```
### Define any resource
secret_id = vault.approle.AuthBackendRoleSecretId(
    f"{approle.name}:{machine.name}",
    role_name=approle.name,
    with_wrapped_accessor=True,
    wrapping_ttl="24h",
)

### Use future to access and use output when available
pulumi.export(
    f"approle:{approle.name}:{machine.name}:state",
    secret_id.wrapping_accessor.apply(lambda accessor: ...)
)
```

Accessing previous state

```
### Retrieve previous state with dummy program
state = pulumi.automation.create_or_select_stack(
    program=lambda: None,
    ...
).export_stack()

### Final stack with real program and previous staet
stack = pulumi.automation.create_or_select_stack(
    program=create_program(state),
    ...
)

### ...
stack.up()
```

MVRE & Pulumi

MVRE NixOS configuration

```
{ config, ... }: {
  imports = [ ./miniotest0.nix ];

  fileSystems."/var/persist".device = "/dev/disk/by-uuid/...";
  fileSystems."/var/lib/minio".device = "/dev/disk/by-uuid/...";

  networking.hostName = "mvre-miniotest1";
  networking.interfaces."intraserv-2" = {
    ipv4.addresses = [{ address = "..."; prefixLength = 23; }];
    macAddress = "...";
  };

  services.udev.extraRules = ''
    ACTION=="add", SUBSYSTEM=="net", ATTR{address}=="${config.networking.interface
  '';
```

MVRE Nix to Pulumi mapping

```
[minio.test]
disks = [
    { name = "miniotest1./", datastore = "mvre_01_200" },
    { name = "miniotest2./", datastore = "mvre_01_200" },
    { name = "miniotest3./", datastore = "mvre_02_201" },
    { name = "miniotest4./", datastore = "mvre_02_201" },
]
machines = [
    { name = "miniotest1", datastore = "mvre_01_200", host = "aatos-l40s.cc.jyu.fi
    { name = "miniotest2", datastore = "mvre_01_200", host = "erkko-l40s.cc.jyu.fi
    { name = "miniotest3", datastore = "mvre_02_201", host = "jane-a30.cc.jyu.fi"
    { name = "miniotest4", datastore = "mvre_02_201", host = "jane-a30.cc.jyu.fi"
]
```

MVRE Pulumi CLI

```
Usage: mvre.py [OPTIONS] PULUMI_PROJECT PULUMI_STACK COMMAND [ARGS]...

  MVRE Pulumi CLI

Options:
  --preview  Require confirmation before proceeding.
  --cancel   Cancel Pulumi lock on stack.
  --help     Show this message and exit.

Commands:
  down
  up
```

MVRE Pulumi Program

```python
def create_pulumi_program(
    project: ProjectStack,
    catalog: FlakeCatalog,
    vault_addr: str,
) -> None:
    disks: Dict[str, vsphere.File] = {}

    for disk in project.disks:
        disks[resource_name(disk.name)] = vsphere_file(disk, catalog)

    for machine in project.machines:
        vsphere_virtual_machine(machine, catalog, vault_addr, disks)
```