What are day-2 operations

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1. What are day-2 operations?
2. Day-2 operations in OSM
3. Charms
   a. Basics
   b. K8s
   c. Actions
   d. Relations and libraries
   e. Build
4. What’s next?
What are day-2 operations?

Operations:

- **Day-0**
  - Actions at instantiation time → cloud-init
- **Day-1**
  - Operations just after instantiating
- **Day-2**
  - Operations done after instantiating

Charm operators
Operator Pattern

Human operator

Install Configure
Upgrade Integrate
Backup Restore

MySQL
Operator Pattern

Install    Configure
Upgrade    Integrate
Backup     Restore

Human operator

MySQL®
Operator Pattern

Charm

Install  Configure
Upgrade  Integrate
Backup  Restore

MySQL®
Day-2 operations in OSM

OSM

LXD/K8s Operators

Proxy Charm
Ops Code

Native Charm

PNF
PNF

VNF
VNF
VNF

Racks

VIM

KNF
KNF

Kubernetes

We will explain this later
Charm anatomy

https://juju.is/docs/sdk/charm-anatomy

- actions.yaml
- charmcraft.yaml
- config.yaml
- metadata.yaml
- README.md
- src
  - charm.py
Charm basics

**metadata.yaml**

- Basic metadata information about the charm
- Endpoints. Used for relations.
  - This is an advanced topic, and it won’t be covered in this presentation

```yaml
name: kamailio
display-name: Kamailio SIP Server
description: Kamailio description...
summary: Kamailio charm summary...
```
Charm basics

```
config.yaml

- Configuration options

  options:
  sip-domain:
    default: "localhost"
    description: Your SIP domain
```

```
requirements.txt

- Any python requirements for the charm to run

  ops >= 1.2.0
```
Charm basics

charmcraft.yaml

- Charmcraft configuration file
- Used when building the charm

```
type: "charm"
bases:
  - build-on:
    - name: "ubuntu"
      channel: "20.04"
  run-on:
    - name: "ubuntu"
      channel: "20.04"
```
Charm basics

src/charm.py

1. **Operator Framework constructs**
2. **Core lifecycle events**
3. **StoredState**

```python
def __init__(self, *args) -> None:
    super().__init__(*args)
    self.framework.observe(
        self.on.config_changed,
        self._on_config_changed,
    )
    self._stored.set_default(sip_domain=None)

def _on_config_changed(self, event):
    self._stored.sip_domain = self.config['sip-domain']
```
K8s charms

Kamailio example:

Pebble can:
- Manage local processes and get logs
- Execute one-shot commands
- Read/write files
metadata.yaml

containers:
  kamailio:
    resource: kamailio-image

resources:
  kamailio-image:
    type: oci-image
    description: OCI image for kamailio
    upstream-source: kamailio/kamailio:5.3.3-stretch
K8s charms

src/charm.py: Observe the pebble-ready event

```python
def __init__(self, *args) -> None:
    super().__init__(*args)
    self.framework.observe(
        self.on.kamailio_pebble_ready,
        self._on_kamailio_pebble_ready,
    )

def _on_kamailio_pebble_ready(self, event):
    # ...
```

Kamailio Workload

Pebble Server

Kubernetes Container
src/charm.py: Create a service to start Kamailio

```python
# ...
def _on_kamailio_pebble_ready(self, event):
    container = self.unit.get_container("kamailio")
    container.add_layer("kamailio",
        {
            "summary": "kamailio layer",
            "description": "pebble config layer for kamailio",
            "services": {
                "kamailio": {
                    "override": "replace",
                    "summary": "kamailio",
                    "command": "kamailio -DD -E",
                    "startup": "enabled",
                }},
        },
        combine=True,
    )
    container.replan()
```
Charm actions

**actions.yaml**

- Actions definition
- Name of the action
- Parameters that the action accepts

```
restart:
  description: Restart Kamailio service
```

**Handling the action: src/charm.py**

```python
class KamailioCharm(CharmBase):

    def __init__(self, *args):
        super().__init__(*args)
        self.framework.observe(
            self.on.restart_action,
            self._on_restart_action
        )

    def _on_restart_action(self, event: ActionEvent):
        """Handler for the restart-action event."""
        try:
            self._restart_kamailio()
            event.set_results({"service restarted"})
        except Exception:
            event.fail(f"Failed restarting kamailio")
```
Charm relations and libraries

It won’t be covered in this presentation.

Reference links:

• Relations
• Libraries
Building charms

$ charmcraft pack
https://juju.is/docs/sdk
What’s next?

“Day2 operations with Kamailio - tutorial”

• How to create an action
• How to expose the action in OSM