Lightweight inventory management with Pallet Jack

Linux.conf.au 2017 sysadmin miniconf
Karl-Johan Karlsson
Problem statement

- Inventory management for system administrators
- Store system information
  - IP addresses, locations, serial numbers, ...
- Generate service configuration
  - DHCP, DNS, configuration management, ...
- Search for static information
  - Location, service contracts, ...
Goals

- Single source of truth for system administration
- Version controlled together with configuration management
- Easily interoperable
- Reasonably scaleable
- Decomposable database
Data store

- “Warehouse” with “pallets” (objects)
- Objects are directories
- Keys and values stored in YAML files
- Inheritance by symlinks and directory hierarchy

```system
├── testvm
│   └── architecture.yaml
│       └── domain -> ../../../domain/example.com/
│       └── machine -> ../../../machine/testvm/
│       └── netinstall -> ../../../netinstall/CentOS-7.2.1511-x86_64/Kickstart_vda/
│   └── role.yaml
```

```
```

```yaml
system:
  role:
    - kvm-server
    - ssh-server
```
Transformations

• Synthesize new values from existing information

• Value substitution and regular expressions

- net.dns.fqdn:
  - synthesize: "#[net.dns.name].#[net.dns.domain]"

- host.pxeboot.kernel:
  - synthesize: "/boot/#[system.os]/vmlinuz"
Database tools

- **create_system**  --warehouse examples/warehouse/  
  --system vmhost1  --domain example.com  --os CentOS-7.2.1511-x86_64

- **dump_pallet**  --position  --warehouse  
  examples/warehouse/  --type system vmhost1

  → […]
  system:
    os: CentOS-7.2.1511-x86_64  # transforms.yaml
    # (line 175, column 15)

  role:
    - kvm-server  # system/vmhost1/role.yaml (line 3, column 4)
    - ssh-server  # system/vmhost1/role.yaml (line 4, column 0)
  architecture: x86_64  # system/vmhost1/architecture.yaml
    # (line 2, column 0)
  name: vmhost1  # transforms.yaml (line 165, column 15)
  […]
Data export tools

palletjack2kea --warehouse examples/warehouse/ --service example-com

## Automatically generated by palletjack2kea from
## Repository: /home/creideiki/src/palletjack/
## Branch: refs/heads/master

[...]

"subnet4": [
    {
        "subnet": "192.168.0.0/24",
        "reservations": [
            {
                "hw-address": "14:18:77:ab:cd:ef",
                "ip-address": "192.168.0.1",
                "hostname": "vmhost1.example.com",
            },
            [...]
        ]
    }
]
Current integrations

- Configuration management: Salt
- System installation: PXELINUX and Kickstart
- DHCP server: Kea
- Authoritative DNS: Knot
- Recursing DNS: Unbound
- (Directory service: FreeIPA)
> require 'palletjack'
> jack = PalletJack.load('examples/warehouse')
> vmhost1 = jack.fetch(kind:'system', name:'vmhost1')
> vmhost1['system.role']
  ➔ ['kvm-server', 'ssh-server']
> jack.each(kind:'system') { |s| puts s['system.name'] }
  ➔ vmhost1
  ➔ testvm
gem install palletjack-tools

https://github.com/saab-simc-admin/palletjack

(or search GitHub for “palletjack”)