## Solaris 11 for Developers Webinar Series

### Agenda

- Click on event to register
- All webinars on Tuesday's 9-10am PT (Event will support VOIP)
- Click [here](http://www.oracle.com/technetwork/server-storage/solaris11/overview/webinar-series-1563626.html) to see a preview teaser

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Registration:

Replay here:
- [Modern Software Packaging for Enterprise Developers](http://www.oracle.com/technetwork/server-storage/solaris11/overview/webinar-series-1563626.html)
Matt Hosanee
Partner Engineering, Oracle EMEA
Objectives of this Presentation

Share ideas to
- Understand what is a service
- How we manage services
- The innovation of service management in Oracle Solaris 11
- How to get hands-on
• Introduction to Services
• Features of SMF
• What is new in Oracle Solaris 11
• In Practice
• Summary
Introduction to Services

Web server ← Web Browser
NFS ← Network Computers
DHCP ← Network Clients
SSH ← Remote Access

Could be higher level eg. Database/Application Server...

“Critical to the dedicated function of the server” - Wikipedia
Introduction to Services

Why the need to manage?

- software is complex with intricate dependencies
- sequential start chain can break easily
- need to restart/monitor services
- diagnosis and management difficult
Introduction to Services

Oracle Solaris 10 dependency graph
Introduction to Services

Previously most SysV Unix's used init & RunLevels

```
# /etc/inittab
# /etc/init.d/
# /etc/rc2.d/S45myserviced
```

Today- plethora of options trying to improve:

- Upstart
- Launchd
- Systemd
- ....
• Introduction to Services
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Features of the Solaris Service Management Facility

First-class objects
Security
Centralised Administration
Dependencies
Config, error, fault & status handling
Parallelism
Features of the Solaris Service Management Facility

kernel → init → svc.startd → …

Service named by Fault Management Resource Identifiers, or FMRIs: \texttt{svc:/system/cron:default}

<table>
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<tr>
<th>Service Name</th>
<th>Instance Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>svc:/milestone/devices:default</td>
<td>default</td>
<td>Devices</td>
</tr>
<tr>
<td>svc:/milestone/network:default</td>
<td></td>
<td>Network interfaces online</td>
</tr>
<tr>
<td>svc:/milestone/single-user:default</td>
<td>1</td>
<td>Single-user mode</td>
</tr>
<tr>
<td>svc:/milestone/sysconfig:default</td>
<td></td>
<td>Basic system configuration</td>
</tr>
<tr>
<td>svc:/milestone/name-services:default</td>
<td></td>
<td>Any one of NIS,NIS+,DNS or LDAP</td>
</tr>
<tr>
<td>svc:/milestone/multi-user:default</td>
<td>2</td>
<td>Multiuser mode</td>
</tr>
<tr>
<td>svc:/milestone/multi-user-server:default</td>
<td>3</td>
<td>Multiuser server mode</td>
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Features of the Solaris Service Management Facility
Features of the Solaris Service Management Facility

SMF keeps a state for each service

- uninitialized has not been evaluated yet
- disabled service is disabled, not running
- offline enabled, waiting for dependencies
- online enabled and running
- maintenance service problem occurred
- legacy_run started through legacy scripts
Features of the Solaris Service Management Facility

Exploratory:

# svcs

Administration:

# svcadm

Access to repository:

# svccfg

List Properties:

# svcprop
Features of the Solaris Service Management Facility

Logs: (Inspect with `svcs -x`)

# /var/svc/log (or /etc/svc/volatile before single-user milestone)

Configuration: (Used by `svc.configd`, Access by `svcprop` or `libscf`)

# /etc/svc/repository.db

Manifests:

# /lib/svc/manifest (/var... on Solaris 10)
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What is new in Oracle Solaris 11

Decorations/Layers

– Data in repository to determine where a property came from (manifest, profile, svccfg/libscf (admin)): svccfg listcust

– Solve long-standing upgrade problems – capture intent
– Better configuration replication
– Rollback to as-delivered system: svccfg delcust

Multiple manifests can deliver non-overlapping configuration of the same service
– Allow easier deployment of multi-instance services like pkg/server, apache

Profiles can deliver new instances of system-delivered services
What is new in Oracle Solaris 11

SMF Layers:

```
admin
svcsng, other command line tools
enabled=false

site-profile
/etc/svc/profile/site

system-profile
/etc/svc/profile/generic.xml
sendmail.xml
enabled=true

manifest
/lib/svc/manifest
sendmail.xml
enabled=false

Captures provenance of properties
svccfg listprop -l all shows all layer values
```
What is new in Oracle Solaris 11

- More Intelligent restart Detection

- An administrator can change method context details on command line
  
  - Audited Configuration

  - New Configuration features – read-protect properties, ordered lists, new SCF_TYPE_NET_ADDR type, more networking type validation

  - SMF Profiles – /etc/svc/profile/site/... (can help automated installs)

    # svccfg apply my_hardened_config.xml
What is new in Oracle Solaris 11

Service FMRIIs available in DTrace

```bash
#!/usr/sbin/dtrace -s
syscall:::entry
{
    @[stringof(curthread->t_procp->p_ct_process->conp_svc_fmri->
        rs_string)] = count();
}
```

dtrace: script '/var/tmp/foo' matched 228 probes
svc:/network/inetd:default 1
svc:/system/sysevent:default 10
svc:/network/smtp:sendmail 21
svc:/network/physical:nwam 40
svc:/network/ntp:default 50
svc:/system/hal:default 65
svc:/network/datalink-management:default 428
svc:/application/graphical-login/gdm:default 274792
What is new in Oracle Solaris 11

- Enhanced services templates – descriptions, decoration, constraints for properties
- Firewall Integration

```
$ svcadm enable network/ipfilter
$ svccfg -s network/ipfilter:default setprop firewall_config_default/policy = allow
$ svcadm refresh network/ipfilter
$ svcadm enable ftp
$ svccfg -s network/ftp setprop firewall_config/policy = allow
$ svccfg -s network/ftp setprop firewall_config/apply_to = network:192.168.1.0/24
```

- Early Manifest Import /lib/svc/manifest (/var... preserved from S10)

- Fault Notification (email & SNMP)

```
# svccfg setnotify -g to-maintenance mailto:admin@domain.com
# svccfg listnotify -g
Event: to-maintenance (source: svc:/system/svc/global:default)
Notification Type: smtp
Active: true
to: admin@domain.com
```
What is new in Oracle Solaris 11

Image Packaging System (IPS) and actuators

disable_fmri - The given service should be disabled prior to the package operation being performed
refresh_fmri - The given service should be refreshed after the package operation has completed
restart_fmri - The given service should be restarted after the package operation has completed
suspend_fmri - The given service should be temporarily suspended prior to the package operation and enabled once it has completed

IPS:

```bash
file path=opt/myapplication/bin/run-once.sh owner=root group=sys mode=0755
file path=lib/svc/manifest/application/myapplication-run-once.xml owner=root
group=sys \
    mode=0644 restart_fmri=svc:/system/manifest-import:default
```

Manifest:

```xml
...<instance enabled='true' name='default'>
    <exec_method
        type='method'
        name='start'
        exec='/opt/myapplication/bin/run-once.sh'
        timeout_seconds='0' />
...```
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In Practice

Time to start thinking about the next steps:

Step 1 - No need to modify your application (leverage init script)

Step 2 - Refine methods for error cases

Step 3 - Refine processes into services for restart-ability

Step 4 - Customise error/restart handling

Step 5 - Appropriate configuration migration from /etc
In Practice

<service name='system/utmp' type='service' version='1'>
  <create_default_instance enabled='true' />
  <single_instance />
  <dependency name='milestone' grouping='require_all' restart_on='none' type='service'>
    <service_fmri value='svc:/milestone/sysconfig'/>
  </dependency>
  <dependent name='utmpd_multi-user' grouping='optional_all' restart_on='none'>
    <service_fmri value='svc:/milestone/multi-user'/>
  </dependent>
  <exec_method type='method' name='start' exec='/lib/svc/method/svc-utmpd' timeout='60' />
  <exec_method type='method' name='stop' exec=':kill' timeout='60' />
  <stability value='Unstable' />
  <template>
    <common_name><loctext xml:lang='C'>
      utmpx monitoring
    </loctext></common_name>

    <documentation>
      <manpage title='utmpd' section='1M' manpath='/usr/share/man' />
    </documentation>
  </template>
</service>
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Summary

Get the 'free' benefits today!

Availability

Leverage Oracle Solaris features

Demonstrate integration with platform
To Learn More…

Community home:
http://hub.opensolaris.org/bin/view/Community+Group+smf/WebHome

Solaris SMF Blog
https://blogs.oracle.com/SolarisSMF/

Search “Solaris 11 cheat sheet”
Oracle Solaris 11 Information Library @ docs.oracle.com

# man smf

Manifest development:
/usr/share/lib/xml/dtd/service_bundle.dtd.1

• Check out other Webinars in this series
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**Registration:**
Q&A
Hardware and Software
Engineered to Work Together