



Automating Linux for S/390 with the VM Programmable Operator

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Agenda

- Review of PROP Functions
 - PROP for Linux
 - What Do We Automate?
 - How Clever Can You Be?
 - PLINUX: The Tool
 - PLIng: Expanding PLINUX using ssh and syslog
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Review of PROP Functions

- Two parts to a PROP implementation:
 - PROP RTABLE
 - Action Routines
 - PROP receives CPCONIO, MSG, SMSG, etc based on SET command settings
 - Each action routine terminates PROP RTABLE processing (once fired, take the next message)
 - Basic logging performed
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PROP for Linux

- Linux outputs error and system management information in two locations:
 - /dev/console
 - Syslog daemon (either local or remote via UDP)
 - Most “operator” function limited to console using default security configuration
 - Direct root logins normally not permitted on non-physical terminals
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What Makes Sense to Automate?

- System startup/shutdown prompts
 - Resource constraint messages
 - Security alerts
 - Remote versions of constraint and security messages processed by VM SYSLOGD (thanks, Neale!)
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How Complicated Do You Want to Get?

- In general, the complexity of the action routine is relatively low if the message contains sufficient information
 - Events that require additional diagnostics or interaction with the Linux guests are difficult due to CMS single-task structure (involves worker machines to perform extended command sequences)
 - Focus on one-shot messages first.
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Example

- Console message:

```
warning: /dev/earth 98% full
```

- PROP RTABLE:

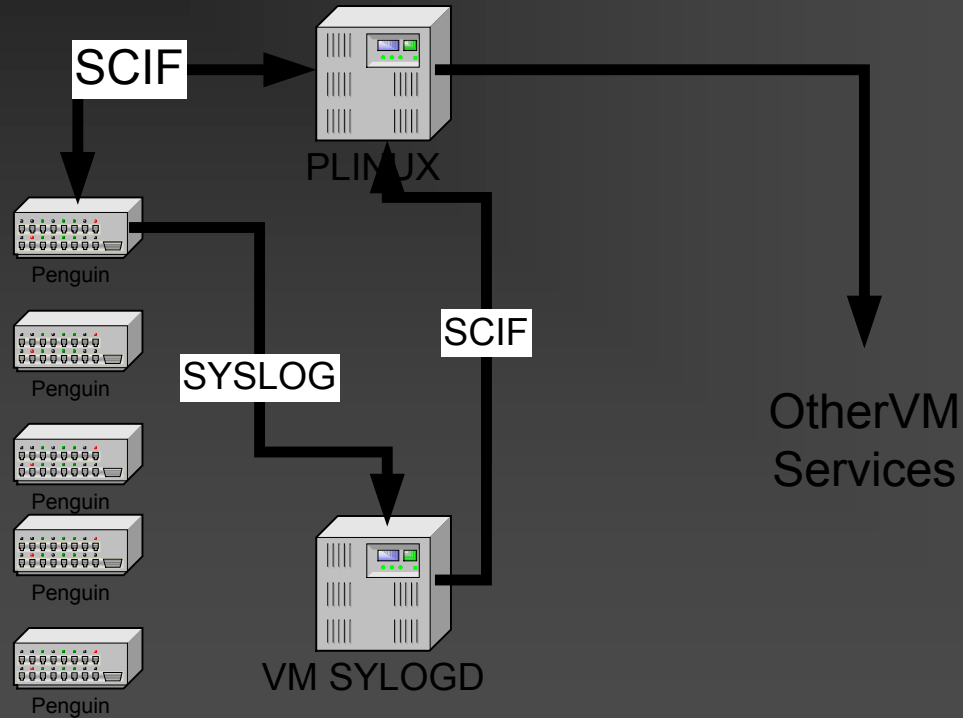
```
* * warning: &1 &2 % full SPACE EXEC Q
```

- SPACE EXEC: sends mail to a paging service to alert a programmer
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PLINUX: The Tool

- Individual action routines getting too complex to manage.
 - Consolidate actions into one routine driven by CMS message repository and parser
 - Handle:
 - Startup messages as far as runlevel 3
 - Basic resource exhaustion messages at 70, 80, 90 100%
 - Simple security scans
 - Periodic availability checks
 - SHUTDOWN/SHUTDOWN ALL CP MSG from VM operator
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PLINUX Overview



PLINUX Overview

- Messages generated on console directly handled by VM PROP in PLINUX machine
 - Startup/shutdown
 - Resource exhaustion
 - Messages generated by syslog are processed and displayed on VM SYSLOGD console and then processed by SCIF to PLINUX
 - Security messages
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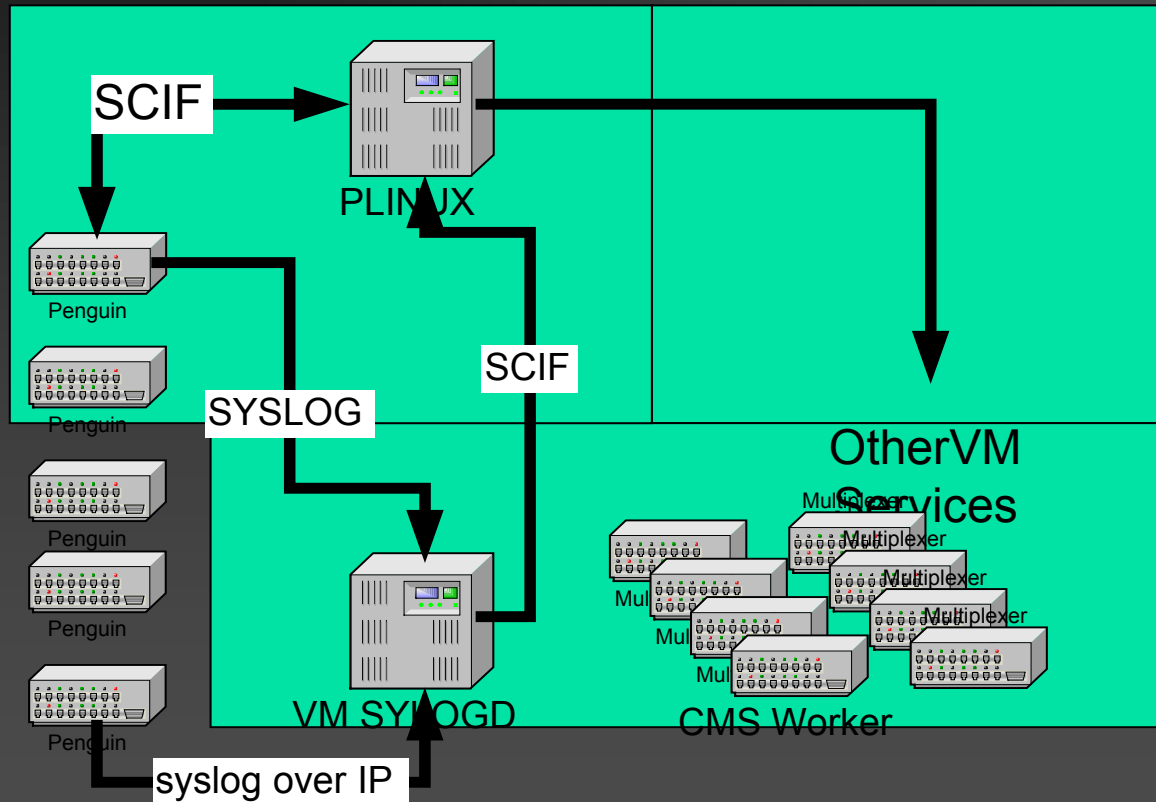
PLIng: The Plan

- Why should virtual servers have all the fun?
 - Syslog is cross system and network friendly – why not expand this to be able to handle action routines operating on remote servers?
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Problems with PLIng

- No clean remote execution facility
 - Rexec works, but is insecure
 - No ssh for VM yet
 - High volume of messages may be an issue for very large farms
 - Set IUCV MSGLIMIT very high (> 24K) for more than 1000 systems
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PLIng Overview



PLIng Overview

- CMS-based workers initially
 - Later, Linux based workers
 - Pick up ssh support
 - Snmp query tools
 - PLIng maintains control via SCIF for the workers
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Summary

- PROP is very useful in developing control systems for Linux guests
 - Combined with CMS Pipelines, you have very powerful tools to build sophisticated management systems.
 - PROP isn't limited to controlling just VM guests any more.
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Questions

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