



# Automating Linux for S/390 with the VM Programmable Operator

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Session L440

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# Agenda

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- 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

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- 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

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- 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?

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- 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?

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- 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

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- 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

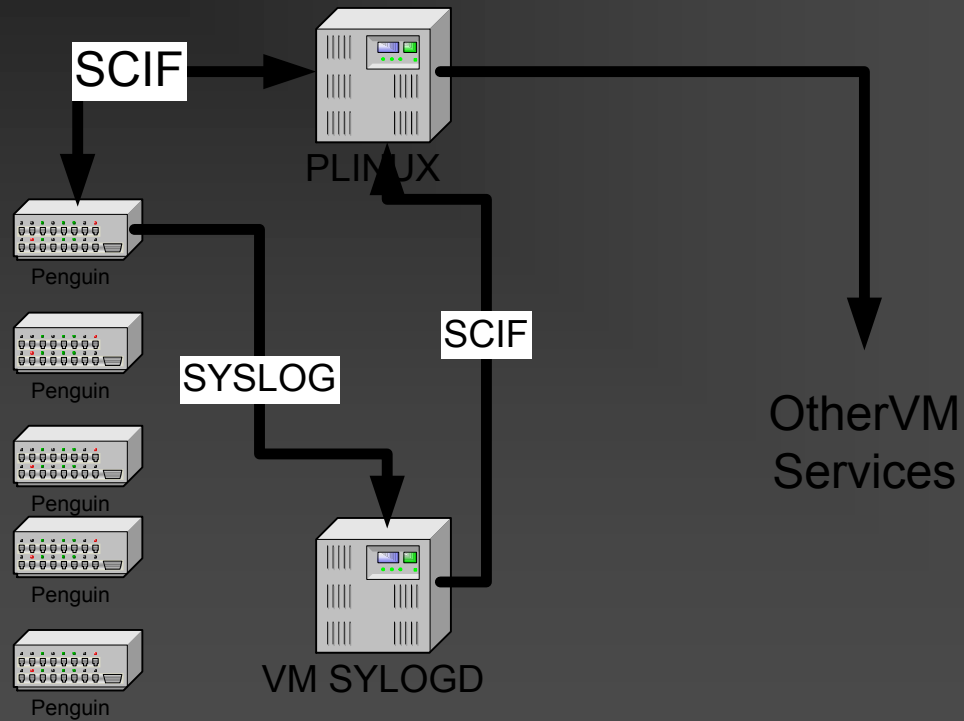
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# PLINUX: The Tool

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- 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

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- 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

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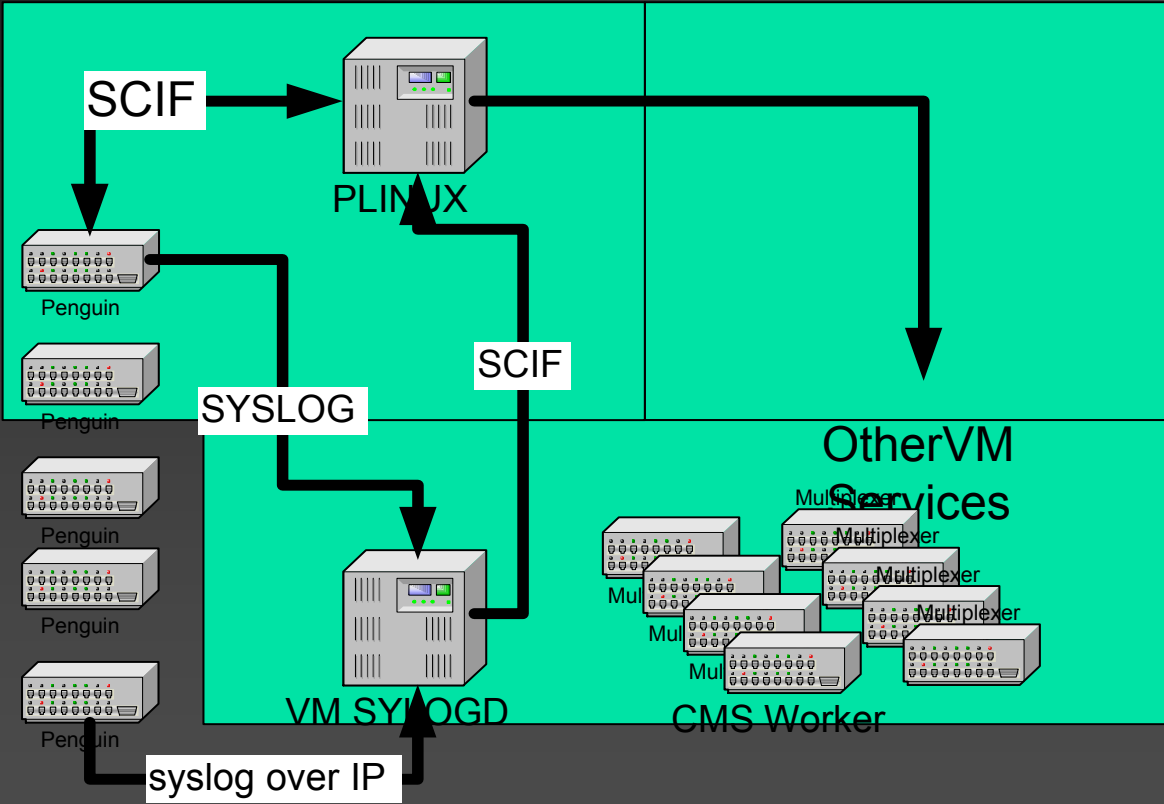
- Why should virtual servers have all the fun?
  - Syslog is cross system and network friendly – why not expand this to be able to handle action routines operating on remote servers?
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# Problems with PLIng

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- 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

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- 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

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- 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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# Contact Information

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