Unix Shell

- A user interface to the UNIX OS
  - as a command-line interpreter (processing commands at prompt)
  - as a high-level programming language (processing commands stored in Shell script)
- The power of shell: productivity
Shell Flavors

- Independent of the underlying UNIX kernel

- A number of shells:
  - sh - Bourne shell
  - csh – C shell
  - ksh – Korn shell
  - tcsh – Enhanced C shell
  - bash - GNU Bourne-Again Shell
  - zsh – Extension to bash, ksh, tcsh
  - pdksh – Extension to ksh
# Unix Shells: Comparison

<table>
<thead>
<tr>
<th>Shell</th>
<th>Roots</th>
<th>Default shell</th>
<th>Facts</th>
<th>Status in ESD</th>
</tr>
</thead>
<tbody>
<tr>
<td>sh</td>
<td>• on all UNIX • standard</td>
<td>• on all UNIX standard</td>
<td>• the most popular • simple and robust • best for shell prog. • system utilities in sh</td>
<td>• all system utilities in sh • all admin tools in sh • most app. scripts in sh</td>
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<tr>
<td>csh</td>
<td>• almost on all</td>
<td>• on all UNIX standard</td>
<td>• a syntax similar to C • good for interactive • buggy for shell prog.</td>
<td>• some app scripts in csh</td>
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<tr>
<td>tcsh</td>
<td>csh</td>
<td>• on all UNIX standard</td>
<td>• best for interactive • login shell in SLAC • less in shell prog.</td>
<td>• default interactive shell • all UNIX systems</td>
</tr>
<tr>
<td>bash</td>
<td>sh</td>
<td>• on Linux</td>
<td>• best for both • less popular</td>
<td>• some system utilities in bash, others in sh</td>
</tr>
<tr>
<td>ksh</td>
<td>sh and csh</td>
<td>• on Linux</td>
<td>• good for shell prog. • less popular</td>
<td></td>
</tr>
<tr>
<td>zsh</td>
<td>tcsh,ksh, bash</td>
<td></td>
<td>• great for UNIX gurus</td>
<td></td>
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</tbody>
</table>
The choice of a scripting language

- **sh**
  - Distributed as standard shell in Solaris
  - System shell programs in sh
  - A large number of utilities, tools, libraries and examples in sh
  - Robust
- **bash**
  - GNU version of sh, free!
  - Extended: better for interactive use as well
  - Fully sh-compatible
  - Distributed as standard shell in Linux
  - Yet, most system shell programs still in sh
  - Sh -> bash: scripts in sh run on both Linux and Solaris.
  - Script in Bash may not always run on Solaris, unless Bash ported
- **perl**
  - Best for sophisticated task
sh v.s bash

jingchen@noric06 $ ls -all /bin/sh
lrwxrwxrwx 1 root root 4 Dec 14 08:40 /bin/sh -> bash*

jingchen@noric06 $ ls /etc/rc.d/init.d
afs* gpm* kudzu* nscd* rwhod* xntpd*
amd* halt* lbcd* pcmcia* sendmail* ypbind*
amd~* identd* linuxconf@ portmap* single* ypbind~*
anacron* inet* lpd* post.install* snapserv* yppasswdd*
apmd* ipchains* lsf* random* snmpd* ypserv*
arpswatch* irda* netfs* routed* sshd*
atd* kdcrotate* network* rstatd* syslog*
crond* keytable* nfs* rusersd* taylor*
functions* killall* nfslock* rwalld* xfs*

jingchen@noric06 $ more /etc/rc.d/init.d/afs
#!/bin/sh
#
# AFS Start and stop AFS components
#
#
# chkconfig: 345 60 20
# description: AFS is a distributed file system which provides location
# transparency, caching and secure authentication.
# Additional configuration can be done in the /etc/sysconfig/afs
# file. Read the documentation in that file for more information.
#
# Note that AFS does not use a pid file in /var/run. It is turned off by
# unmounting /afs.
#
# Gather up options and post startup script name, if present
if [ ! -f /etc/sysconfig/afs ]; then
  . /etc/sysconfig/afs
else
Recommendation

• The rules of game:
  – use sh shell for shell programming;
  – use tcsh shell for interactive use;
  – use perl for sophisticated tasks.

• Standalization:
  – generating a template for shell programming