RS/6000 SP
Software Maintenance

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RS/6000

Agenda

IBM
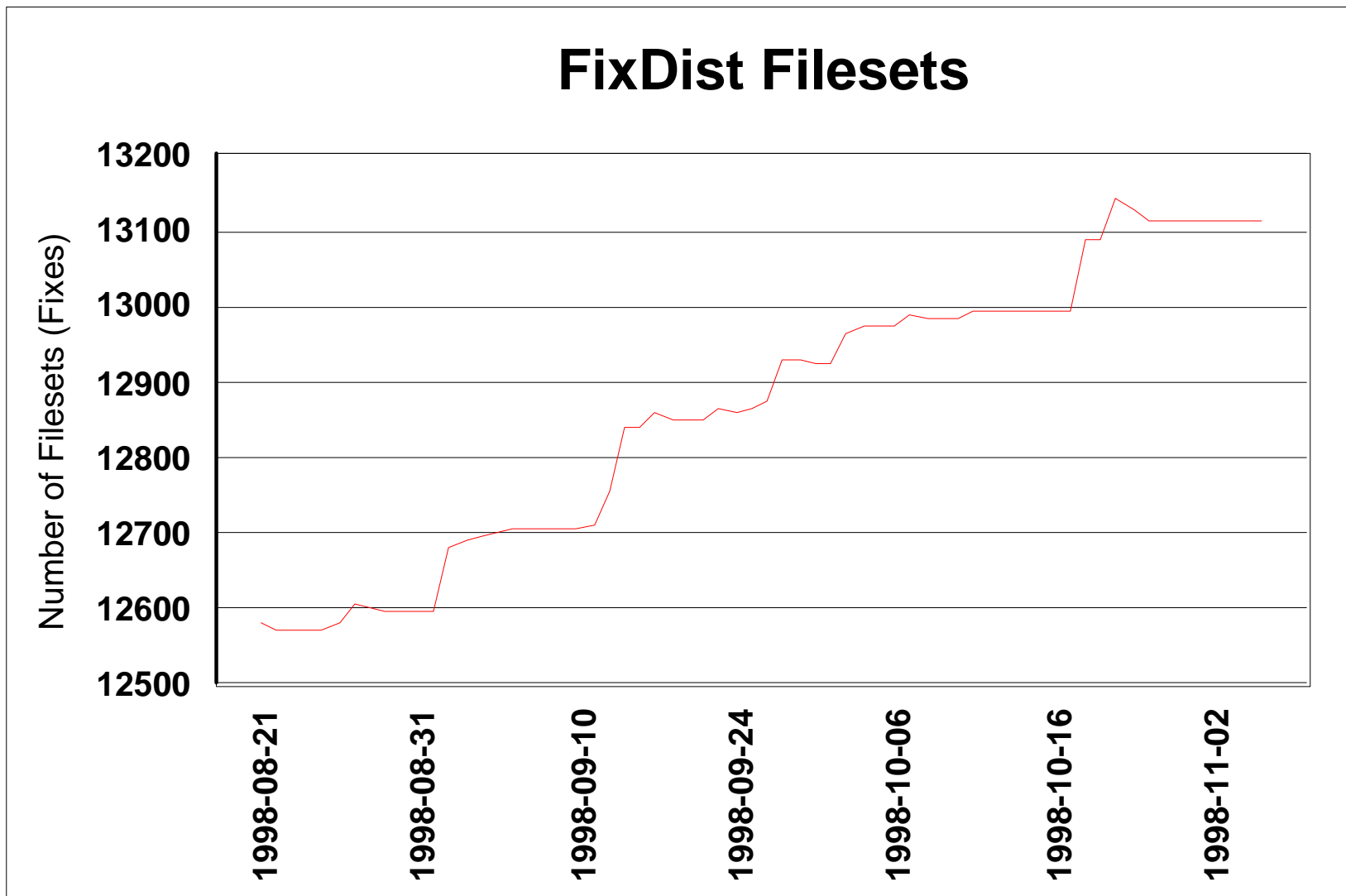
- Motivation
- Current Practices
- Challenges
- AIX Packaging

- NIM
- Proposed Strategy
- Prototype TaskGuides
- Useful Web Resources

Software Maintenance

SP World

RS/6000

Motivation

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RS/6000 SP systems are at the core of complex dynamic business critical applications.

- New AIX & LPP versions, releases and modification levels:
  - *New Function*
  - *New Hardware Support*

- New AIX & LPP updates:
  - *In response to reported defects*
  - *In relation to Y2K*

- Application software requirements

- Support for AIX & LPP versions, releases and modification levels is withdrawn

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FixDist Filesets

Number of Filesets (Fixes)

13200	
13100	
13000	
12900	
12800	
12700	
12600	
12500	

1998-08-21 1998-08-31 1998-09-10 1998-09-24 1998-10-06 1998-10-16 1998-11-02
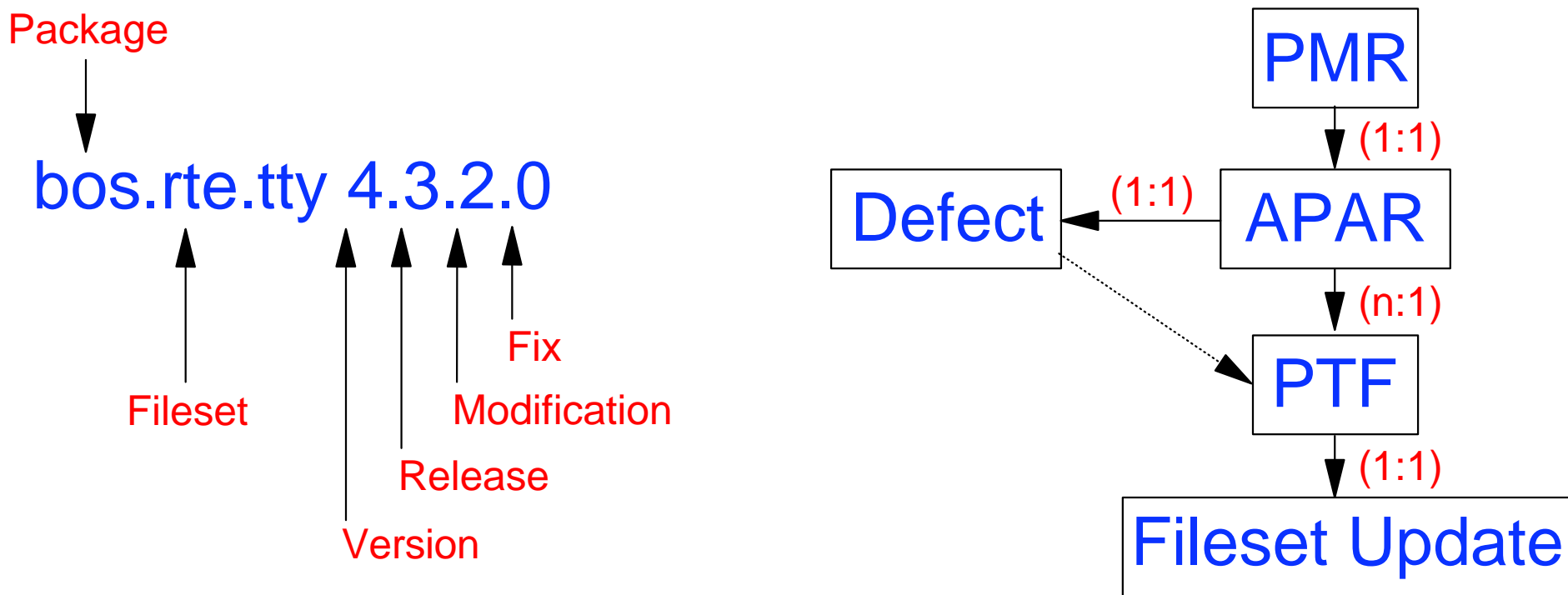
RS/6000

Motivation

IBM

Industry/ Application	CWS or SPOT or Node(s)	AIX V.R.M Level	Number of filesets installed	Number of filesets requiring updates	Average number of fix levels behind latest fix level per fileset
Petroleum	CWS	4.2.1	579	232	3.86
	64	4.2.1	342	202	4.03
Health	13	4.1.5	410	197	9.43
Notes	75	4.2.1	1146	209	5.35
Utilities	CWS	4.2.1	282	153	3.91
	SPOT	4.2.1	416	180	2.93
	Node 1	4.2.1	173	119	4.79
	Node 3	4.2.1	298	142	2.90
	Node 4	4.2.1	290	138	2.86
	Node 5	4.2.1	292	138	2.86
	Node 9	4.2.1	291	138	2.86
	Node 17	4.2.1	289	138	2.83
Public Sector	CWS	4.2.1	276	137	1.31
	4	4.2.1	258	132	2.63
SAP	CWS	4.3.1	280	173	1.70

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Current Practices

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- None. The "ignorance is bliss" defence.

- None. The "if it ain't broken, don't fix it" defence.

- None. The "gold code is good" defence.

- Selective fixes. When something breaks, apply as few updates as possible.

- The big bang approach. A large number of fixes are applied to support a hardware or software upgrade (usually after the new hardware or software has been installed and the system is broken).

- Software levels are reviewed quarterly, and the latest software maintenance is tested, then applied to the system. (Sure!)

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Challenges

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- A lack of tools to:

    - Measure software currency.

    - Manage updates on an RS/6000 SP or RS/6000 cluster.

- Software maintenance is not very glamorous.

- Quality and quantity of service information.

- No articulated strategy.

- Availability and distribution of updates is problematic.

- Updates have been known to cause errors.

- Software maintenance is evil and horrible and does wicked things to your system!

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AIX Packaging

IBM

- Fileset:

  - Logical Group of Ship Files

  - Smallest Installable / Updateable Entity

Package

bos.rte.tty 4.3.2.0

Fileset

Fix

Modification

Release

Version

PMR

(1:1)

Defect ← (1:1) APAR

(n:1)

PTF

(1:1)

Fileset Update

AIX Packaging

IBM

- ## Package:

  - ### Collection of one or more filesets built to form one backup file format (BFF) image.

- ## Licensed Program Product (LPP):

  - ### Purchaseable product made up of one or more packages.

- ## Backup File Format (BFF):

  - ### Packaging format understood by **installp**.

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AIX Packaging

IBM

Version
- Major Design Changes
- Binary Compatability Breaks
- Interface or Semantic Changes
- Command I/O Format Changes
- Packaging Changes

Release
- Major New Function
- Install/Maintenance Impacts
- Requisites

Modification (Maintenance)
- Deferred Defects
- New Hardware Support
- Message Catalogs

Fix
- Customer Reported Defects
- Internally Reported Defects
- Regression

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AIX Packaging

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- ## Pre-requisite (prereq):

  - ### Installation requirement of one fileset on another.

  - ### Used where xyz.abc.rte uses some command from xyz.abc.com during execution of install scripts.

- ## Co-requisite (coreq):

  - ### Functionally dependent requirement of one fileset on another.

  - ### xyz.abc.adt coreqs xyz.abc.rte means that when xyz.abc.adt is installed, xyz.abc.rte is already installed or will also be installed.

AIX Packaging

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- Install requisite (instreq):

  - Installation dependency on another fileset.

  - An instreq is used if xyz.msg.en_US.abc should only be installed if xyz.abc.rte is already installed or on the list of filesets to be installed.

- If-requisite (ifreq):

  - Conditional requisite.

  - If xyz.abc.rte is installed, and xyz.abc.com.1.2.3.4 is being installed, then xyz.abc.rte.1.2.3.4 must also be installed.

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AIX Packaging

IBM

- **Service Delivery Channels:**
  - *Electronic - FixDist, WWW*
  - *Media (diskette, QIC-120, 4mm, 8mm & CDROM) - Support Centre*

- **Service Deliverables:**
  - *Fileset Updates (PTFs)*
  - *Modification Levels (ML 4150)*
  - *Recommended Maintenance Levels (RML 4210-04)*
  - *Latest Updates*
  - *PTF Sets (PSSP)*
  - *Quarterly security updates*
  - *Y2K updates*
  - *Mail (send help to aixserv@austin.ibm.com)*

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AIX Packaging

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- Recommended Maintenance Levels:

  - Stable set of AIX preventative maintenance.

  - Collection of available software updates.

  - Rigorously tested in ARTlab (APAR Regression Test Laboratory).

  - Available (roughly quarterly) for AIX 4.1.5, 4.2.1, and 4.3.2.

  - Orderable via a single APAR.

  - Naming convention: 4150-01

  - Verify via **instfix** command:
    - *instfix -iqk 4320-01_AIX_ML*

  - Beware of old RMLs.

RS/6000

AIX Packaging

IBM

- Fileset Updates:

  - Updates are cumulative back to the last base level fileset:

    ```
    -rw-r--r--   1 root   bin   656384 Nov 16 05:37 bos.rte.tty.4.3.2.0.bff
    -rw-r--r--   1 root   bin    58368 Nov 16 05:37 bos.rte.tty.4.3.2.1.bff
    -rw-r--r--   1 root   bin   303104 Dec 24 09:48 bos.rte.tty.4.3.2.2.bff
    -rw-r--r--   1 root   bin   436224 Feb 24 10:29 bos.rte.tty.4.3.2.3.bff
    -rw-r--r--   1 root   bin   439296 Mar 26 18:17 bos.rte.tty.4.3.2.4.bff
    -rw-r--r--   1 root   bin   440320 Apr 18 23:34 bos.rte.tty.4.3.2.5.bff
    ```

  - There is a one-to-one mapping between filesets and update images (.bff files).

  - Requisites in and between updates are limited.

  - For AIX, updates are created at the current modification levels only.

- **mksysb** resource:
  - *Represents the location of a file that contains an archived system image created by the* **mksysb** *command.*

- **SPOT** resource:
  - *Represents a Shared Product Object Tree which is a directory containing BOS run-time files and other packages required for NIM operations.*

- **lpp_source** resource:
  - *Represents a directory containing BOS and LPP software packages used during software installation operations.*

- **installp_bundle** resource:
  - *Represents the name of a bundle file that can be used with the* **installp** *command. The file contains a list of filesets with (optionally) specified V.R.M.F levels.*
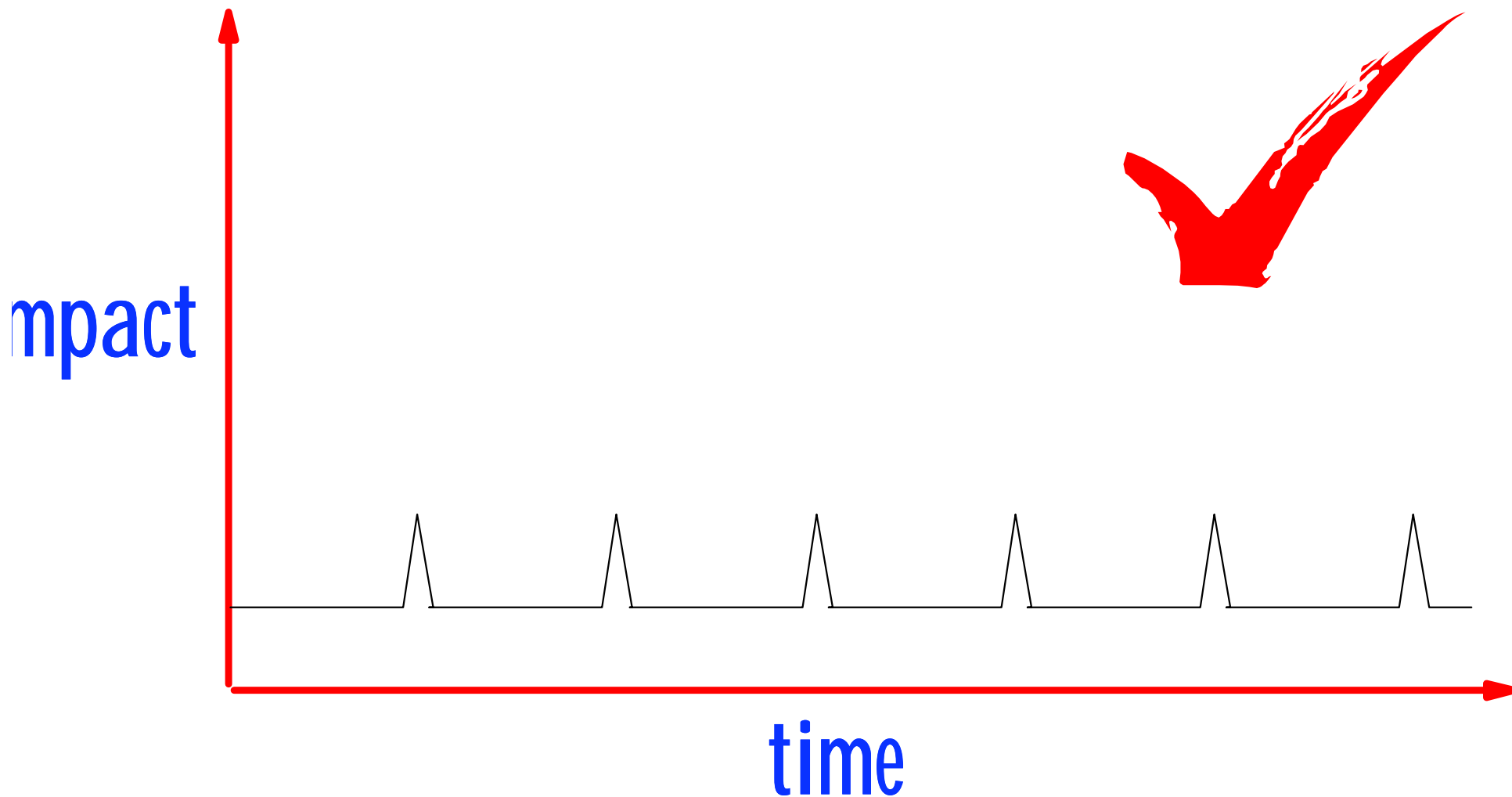
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Proposed Strategy

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RS/6000 SP systems should be maintained in a serviceable state through the regular application of software maintenance.
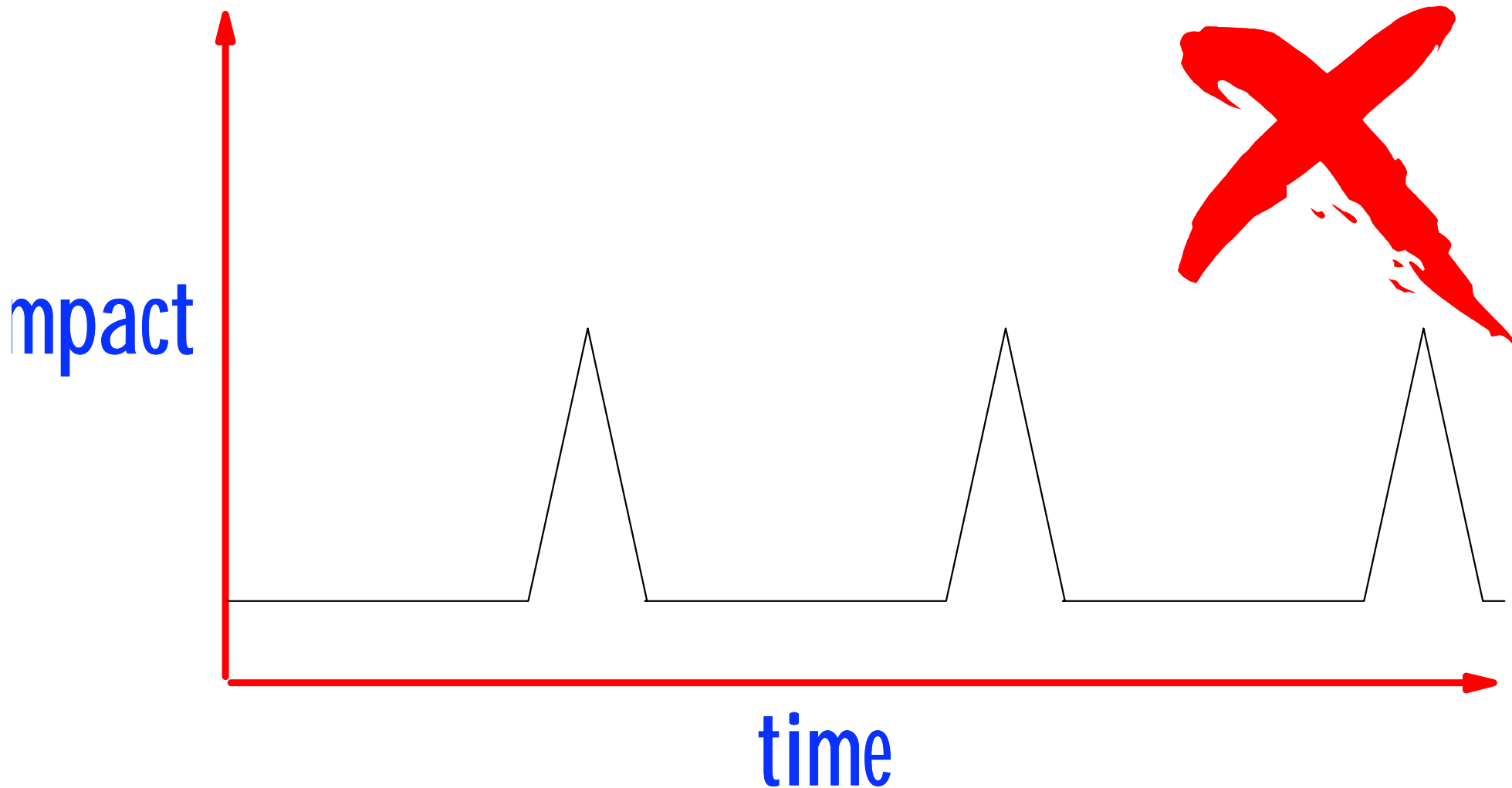
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Proposed Strategy

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Impact

time

Proposed Strategy

mpact

time

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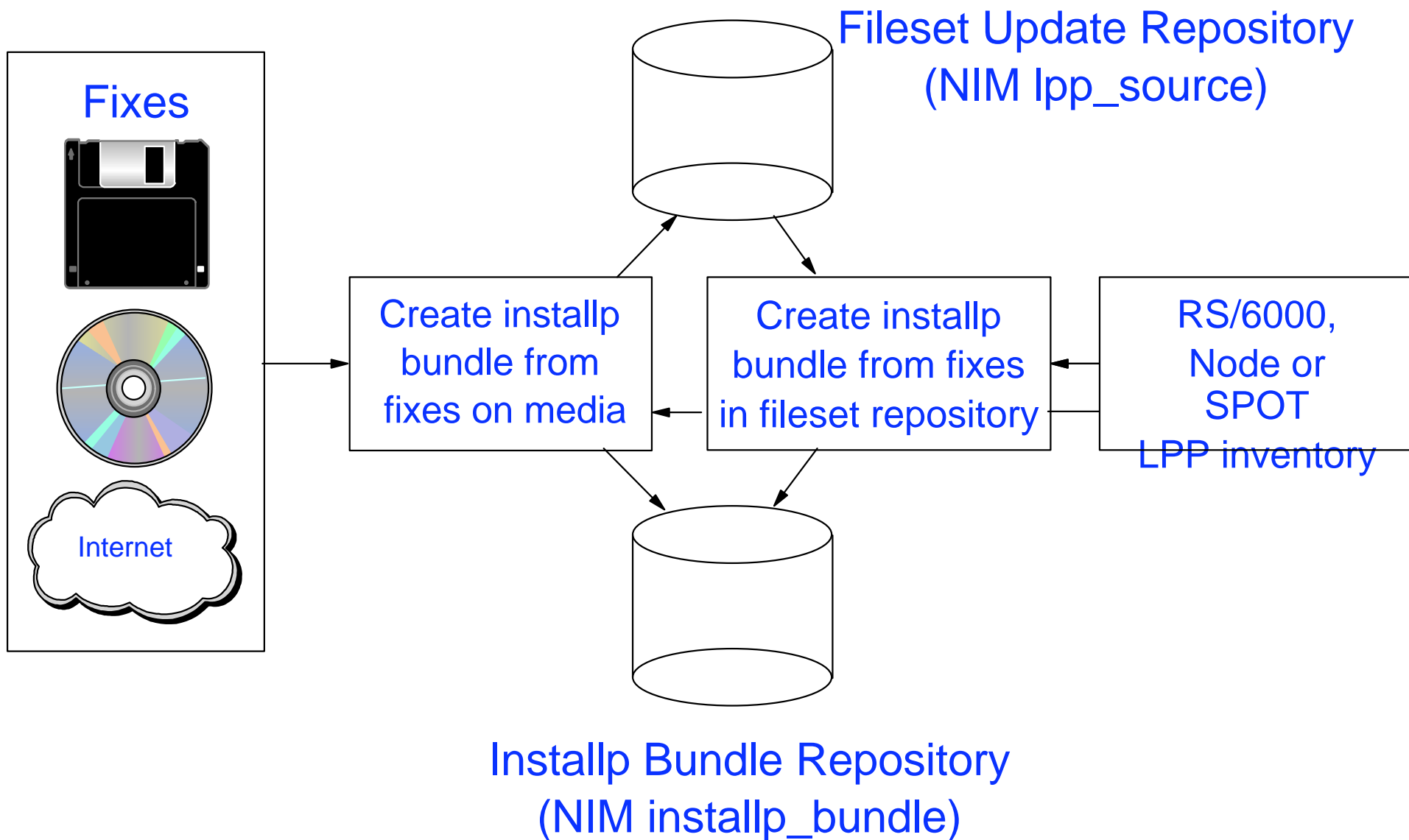# Software Maintenance TaskGuide

IBM

- Shipped with base AIX.

- Run stand-alone or under WebSM.

- Major functions:
  - *Measure system software currency*
  - *Manage software update resources*
  - *Perform software maintenance operations*

- Support for:
  - *Stand-alone RS/6000*
  - *Remote stand-alone RS/6000*
  - *NIM environment*
  - *RS/6000 SP*

RS/6000

Software Maintenance TaskGuide

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Fixes

Fileset Update Repository (NIM lpp_source)

Internet

| Create installp bundle from fixes on media | Create installp bundle from fixes in fileset repository | RS/6000, Node or SPOT LPP inventory |

Installp Bundle Repository (NIM installp_bundle)

Software Maintenance TaskGuide

Fileset Update Repository (NIM lpp_source)

Application of fixes specified
by installp_bundle using
installp or NIM **cust**
operation

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Nodes

SPOTs

Installp Bundle Repository (NIM installp_bundle)

RS/6000

Software Maintenance

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This TaskGuide is designed to assist with the management of software maintenance.

Select the software maintenance operation to be performed:

◇ Display system software currency

◇ Manage software update resources

◇ Perform software maintenance operations

Next >   Cancel

Software Maintenance

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Software currency is determined by examining the fix level of installed filesets on a target environment and comparing these to a given level of software updates.

Select the target environment for which software currency information is required:

◇ This machine (sa0000e0)

◇ Another machine (using a file containing fileset information collected from that machine)

◇ NIM clients or NIM SPOT resources

◇ Node or group of nodes within an RS/6000 SP system

< Back   Next >   Cancel

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Select the type of RS/6000 SP nodes for which software currency information is required:

◇ A single node

◇ One or more AIX 4.3.1 nodes

◇ One or more AIX 4.3.2 nodes

< Back   Next >   Cancel

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All AIX 4.3.2 RS/6000 SP nodes are displayed below. Select the nodes for which software currency information is required. Multiple nodes can be selected by pressing and holding the **Ctrl** key while selecting the node.

Node Name
sa0101e0
sa0105e0
sa0106e0
sa0111e0

`< Back`   `Next >`   `Cancel`

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Select the source location of the software updates against which the software levels of the target environment will be compared:

◆ System input device/directory

◆ Local directory

◆ NIM lpp_source resource

◆ AIX Fix Distribution Service (FixDist)

< Back   Next >   Cancel

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Select the system input device/directory that contains the software updates:

Installation Directory (/usr/sys/inst.images) −

< Back   Next >   Cancel

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Computing software currency information may take a few minutes depending on the size of the target environment. The software currency report can also be written to a file on this machine.

☐ Write the software currency report to this file:

/tmp/software_currency_report.1999-05-15

Click **Next** to begin this operation.

< Back | Next > | Cancel

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Software Currency Information

Summary Statistics

Description	Value
Total number of filesets installed	206
Total number of filesets for which updates are available	43
Average number of updates behind latest fix level for all filesets	0.36
Average number of updates behind latest fix level for filesets requiring updates	1.74
Largest number of updates behind the latest fix level for a fileset (bos.rte.serv_aid.4.3.2.0)	4

Filesets for which software updates were found:

Fileset	Current V.R.M.F	Latest V.R.M.F
bos.acct	4.3.2.0	4.3.2.2
bos.adt.debug	4.3.2.0	4.3.2.2
bos.adt.include	4.3.2.0	4.3.2.3

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Software Currency Information

Largest number of updates behind the latest fix level for a fileset (bos.rte.serv_aid.4.3.2.0)	4

Filesets for which software updates were found:

Fileset	Current V.R.M.F	Latest V.R.M.F
bos.acct	4.3.2.0	4.3.2.2
bos.adt.debug	4.3.2.0	4.3.2.2
bos.adt.include	4.3.2.0	4.3.2.3
bos.adt.syscalls	4.3.2.0	4.3.2.1
bos.diag.com	4.3.2.0	4.3.2.1

Filesets for which no software updates were found:

Fileset	V.R.M.F
bos.help.msg.en_US.com	4.3.2.0
bos.help.msg.en_US.smit	4.3.2.0
bos.html.en_US.topnav.navigate	4.3.2.0
bos.msg.en_US.docregister.com	4.3.1.0
bos.msg.en_US.mp	4.3.0.0

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Conclusions

IBM

- Software maintenance strategy developed based on maintenance of systems in a serviceable state.

- Addressing the issues holistically.

- Consistent approach across stand-alone, cluster and RS/6000 SP.

- Tools delivered via TaskGuides:

  - Measure system software currency

  - Manage software update resources

  - Perform software maintenance operations

Software Maintenance

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Software Maintenance
Microcode

IBM

- Part of the hardware.

- Does not include device drivers.

- Supported by the IBM PSS organisation (Customer Engineer)

- Installed with customer concurrence and assistance.

- Microcode levels should be reviewed quarterly.

- Mandatory Engineering Changes (EC's) and Y2K microcode should be applied as soon as possible.

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Software Maintenance
Web Sites & Information

IBM

- RS/6000 microcode:
  - *http://www.rs6000.ibm.com/support/micro*
- AIX Fix Distribution Service:
  - *http://service.software.ibm.com/rs6k/fixdb.html*
- AIX FixDist Application:
  - *ftp://service.software.ibm.com/aix/tools/fixdist*
- RS/6000 Mailing List:
  - *http://www.rs6000.ibm.com/resource/maillist.html*
  - *send "help" to aixserv@austin.ibm.com*
- RS/6000 SP Service Status, Bulletins and Flashes:
  - *http://www.rs6000.ibm.com/support/sp/sp_secure/ status/servstat.html*
  - *http://www.rs6000.ibm.com/support/sp/sp_secure/bulletins/*
  - *http://www.rs6000.ibm.com/support/sp/sp_secure/flash/*

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Thanks for the enormous contribution of many colleagues in Australia, Austin and Poughkeepsie and the support and suggestions of many customers around the world.

The End