GSM (Unix) Generation Procedure

1. Introduction

This document describes a radical change to the generation and installation of GSM (Unix) configurations. The new procedure removes the requirement for a special "GSM (Unix) Tape Generation Server" and allows GSM (Unix) systems to be generated using the standard and well-proven GSM (Windows) CD generation procedure.

This document was originally intended for internal use only but has been released externally because it contains useful "background" material to supplement the information released in the GSM (Unix) Configuration Notes.

The only minor disadvantage of the new procedure is that the GSM (Unix) distribution media is a Windows CD instead of a Unix tar format DAT or QIC tape. The reseller performing the installation must copy (via ftp, for example) the relevant files from the Windows CD to the target Unix server. It is assumed that all "target" Unix servers will be connected, via TCP/IP, to at least one Windows PC with a CD drive.

2. An Overview of the current GSM (Unix) Generation Procedure

GSM (Unix) DAT or QIC tapes are currently generated via a 2-stage procedure on a SCO Unix server, *tistape*. This SCO server is referred to as the "GSM (Unix) Tape Generation Server" (GUTGS). The GUTGS contains a copy of PROVOL, copies of all the required PGK's and copies of all the GSM (Unix) Configuration Volumes (CV's). This server also contains the latest BACNAT images for all the supported versions of Unix.

The first stage of the Generation process involves running GEN to generate the various distribution volumes on domain 260. Note that the GSM (Unix) on the GUTGS is specially configured to include a local domain at address 260.

The second part of the generation procedure involves running a complex Unix Bourne shell script that renames the sub-volume files within the 260 domain, merges the 260 domain (A60.dir) with the template BACNAT software and runs the Unix tar utility to generate a tape of the required format.

3. Disadvantages of the GSM (Unix) Generation Procedure

The current GSM (Unix) Tape Generation Procedure suffers several disadvantages from the GSM (Windows) CD Generation Procedure:

- A special Unix server must be maintained in the Production Dept. in Bourne End to function as the "GSM (Unix) Tape Generation Server";

- It is not possible for the GUTGS to share the same master PGK's that are used by the GSM (Windows) CD generation procedure. Maintaining 2 sets of "master" PGK's invariably means that the set of PGK's on the GUTGS fall behind the "true" masters on the various Bourne End Production servers.

- Although the GSM (Unix) BACNAT masters are only present on the GUTGS the location of these masters is not as "well known" as the GSM (Windows) master folder (see IN174).

- The GSM (Windows) CD Generation Procedure is considered "water tight" in that several QC stages and self-checks minimise the chances of a faulty generation (i.e. the only step that is not self checked is whether the CD has been inserted into the case). Although more checks could be added to the GSM (Unix) Tape Generation Procedure this would involve amending already-complex Unix scripts;

- The non-technical Production Dept. personnel are very familiar with the GSM (Windows) CD Generation Procedure. They are not so familiar with the GSM (Unix) Tape Generation Procedure. Although training and work-instructions have been provided for the GSM (Unix) Tape Generation Procedure the unfamiliarity with this procedure means that any errors may not be immediately recognised;

- The reliability of the DAT drive is a single point of failure in the GSM (Unix) Tape Generation Procedure. Although the DAT drive on the GUTGS could be replaced by others on the Unix network this would involve a potentially confusing change to the procedure;

- All the compatibility problems between HP-UX DAT drives and other DAT drives disappear if the software is distributed on an industry-standard Windows CD;

- The distribution of GSM (Unix) systems on a Windows CD is a further step along the path of distributing all software on the un-serialised monthly GPS CD.

4. An Overview of the New Procedure

This section describes the changes required to implement the new procedure:

- All GSM (Unix) "DAT" configuration files must be amended to change the SSD Volume Format from T151Z to T259Z. This change, which has some further consequences (see below), is required to allow GEN to generate distribution volumes on a GSM (Windows) T259Z domain. This change has already been suggested by several resellers in order to bring GSM (Unix) configurations closer to GSM (Windows);

- ALL GSM (Unix) "DAT" configuration files must be copied to the Bourne End (Production Dept.) GSM (Windows) network;

- The various GSM (Unix) BACNAT masters must be copied to the "CD master" folder, within a new folder, *Unix*. A minor change to the QC template file will be required to add the Unix folder to the list of folders that must be present on the CD;

- **NO CHANGES** are required to the CD Generation Procedure (see IN174). The only procedural change is that the work-instruction described in IN174 now applies to all the GSM (Unix) DAT configuration codes (e.g. 5552 etc.) in addition to GSM (Windows) 5663;

- The GSM (Unix) Configuration Notes must be amended to explain that the reseller/installer must transfer the following files/folders from the supplied Windows format CD to a suitable temp directory on the target Unix server:

  GSM260\
  xxxx_v.vvv

  (where *xxxx* is the Unix Class name (e.g. SCO, AIX, HPUX etc.) and *v_vvv* is the required BACNAT variant number (e.g. 3.298))

  Important Note-1: All files within the GSM260 folder must be copied **without** any renaming.

  Important Note-2: However tempting it may be, there is no requirement for the reseller/installer to rename GSM260 to the more familiar A60.dir.

- The glinstall script must be changed to perform the following file move after extractiing the contents of the xxx_v.vvv BACNAT image file:

  mv ./GSM260 ./global/data/A60.dir

- The GSM (Unix) SSD controller must be modified to recognise GSM (Windows) SSD file names (e.g. 01BACRES.SVL) in addition to GSM (Unix) SSD filename (e.g. SVL01_BACRES). This change will avoid the requirement for complex file renaming code in the glinstall script;

- A new utility must be provided to convert a T151Z Domain Header file to T259Z format; and to round-up the size of all the T151Z SSD files (N * 8kb) to a multiple of 32Kb to conform to a T259Z SSD file (N * 32kb).

5. Technical Details

This section describes various technical issues required to implement this procedure.

5.1 Volume Format T259Z

Volume Format T259Z is the standard SSD/DDF volume format for GSM (Windows) configurations. The Generation PC in Bourne End is configured with T259Z as the DISTBN unit, 260. The GEN process extracts the Starter System IPL Volume Format from

the configuration file. If the IPL Volume Format is not supported on the PC that is performing the generation then GEN will fail. Several options are possible:

A. Change all GSM (Unix) configuration files to use Volume Format T259Z, instead of T151Z;

B. Change all GSM (Windows) configuration files to use Volume Format T151Z, instead of T259Z;

C. Change GEN to allow an IPL Volume Format of T151Z to be used on a T259Z run-time system;

D. Switch the 260 Volume Format on the Bourne End CD Generation PC between T259Z and T151Z depending on the type of system that is being generated.

Option (B) can be dismissed immediately. Although options (C) and (D) require no changes to the GSM (Unix) run-time code both changes are potentially very disruptive internally. Option (C) could potentially de-stabilize the GEN program and all the related meta-jobs. Option (D) will complicate the CD Generation procedure which has been fine-tuned for simplicity and robustness.

Although option (A) requires post-installation changes to existing sites, it does ensure that GSM (Unix) systems are compatible with GSM (Windows). This will simplify the installation of a generic, unserialised SYSRES.

5.2 Configuration File Changes

The CVMAST volume contains a job, T259Z, which will upgrade a GSM (Unix) configuration file from Volume Format T151Z to T259Z. At the time of writing, only CV5552 has been upgraded. This Configuration Volume is now available on the Bourne End generation network.

5.3 Changes to GSM CD Image Master

The GSM (Unix) BACNAT packaging script, gsmpack, has been modified to create a BACNAT image file with the required name (see C0-3836).

As a post-packaging stage, the nascent GSM (Unix) BACNAT image files must be copied to the Unix folder on the CD Generation PC:

\\tisbcdrpc\global\unix\

Note that this Unix BACNAT folder has been added to the list of folders that must be present on the CD;

5.3 Changes to the CD Generation Procedure

NO CHANGES are required to the CD Generation Procedure (see IN174).

5.4 Changes to the GSM (Unix) glinstall script

The glinstall script has been modified to support the -i option (see C0-3843).

5.5 Changes to the GSM (Unix) SSD Controller

The run-time SSD controller and the bootstrap part-1 have been modified to perform a validation pass of the SSD directory. This validation phase renames any GSM (Windows) style DDF filename to GSM (Unix) style; and also converts all filenames to upper-case.

Note that a related change to automatically resize the Domain Header File is considered too dangerous. A new utility, glt259z, is available to perform this conversion (see C0-3717).

6. Installation Instructions

This section contains the revised Installation Notes for GSM (Unix) configurations. All the relevant GSM (Unix) Configuration Notes must be amended to include this section.

6.1 IMPORTANT NOTE: T224Z and T259Z SSD formats

The release of GSM (Unix) on a Windows format CD provides us with the opportunity to rationalise the GSM (Unix) and GSM (Windows) systems. The most important change is the replacement of the GSM (Unix) DDF volume format T151Z by the GSM (Windows) DDF volume format T259Z.

ALL GSM (UNIX) CONFIGURATIONS GENERATED ON DISKETTE, QIC TAPE OR DAT TAPE WERE DISTRIBUTED WITH DDF VOLUME FORMAT T151Z.

ALL GSM (UNIX) CONFIGURATIONS GENERATED ON A WINDOWS FORMAT CD ARE DISTRIBUTED WITH DDF VOLUME FORMAT T259Z.

VOLUME FORMAT T259Z IS SLIGHTLY INCOMPATIBLE WITH VOLUME FORMAT T151Z.

The size of the Domain Header File (e.g. 00SVL_SYSDOM) for a T151Z format configuration must be exactly 32Kb. The size of the Domain Header File (e.g. 00SVL_SYSDOM) for a T259Z format configuration must be exactly 64Kb. If the size of the Domain Header File for a T259Z format configuration is not exactly 64Kb the following warning message will appear:

> **glintd: Warning 1242 - Domain header file wrong size for volume format**
> ***directory_path/SVLnn_xxxxxx***

The size of each sub-volume file (e.g. 01SVL_SYSRES) for a T151Z format configuration must be an exact multiple of 8Kb. The size of each sub-volume file (e.g. 01SVL_SYSRES) for a T259Z format configuration must be an exact multiple of 32Kb. If the size of a sub-volume file for a T259Z format configuration is not an exact multiple of 32Kb the following warning message will appear:

glintd: Warning 1229 - Unix file not multiple of Global System Manager track size

directory_path/SVLnn_xxxxxx

For fresh GSM (Unix) installations, with no existing GSM (Unix) domains this change to volume format T259Z will be invisible.

For existing GSM (Unix) installations, with existing GSM (Unix) domains, a post-installation step will be required to allow the volume format T259Z system to recognise existing T151Z GSM (Unix) domains. For these upgrade installations, the glt259z utility must be used to upgrade all "T151Z format" directories to "T259Z format". For example:

glt259z B00.dir

6.2 Pre-requisites

In order to install the GSM (Unix) software from this CD the "target" Unix server must be connected to a Windows PC configured with a CD drive. A Windows-to-Unix File Transfer utility must be available to transfer a number of files from this CD to the "target" Unix server.

IF IS NOT POSSIBLE TO TRANSFER FILES FROM THIS CD TO THE TARGET UNIX SERVER PLEASE CONTACT THE GLOBAL SUPPORT DEPT. (HOTLINE) TO ARRANGE A DATA TRANSFER TO A SUITABLE UNIX TAPE.

6.3 File Transfer

The following folders and files must be transferred to a suitable directory on the target Unix server. If an ftp utility is used be careful to ensure that all files are copied in BINARY mode.

1. Copy the GSM260 folder and all the *.svl files within this folder.

   Do NOT rename GSM260 to a GSM (Unix) style directory name (e.g. A60.dir).

   Do NOT rename any of the files within the GSM260 directory (e.g. 01BACRES.svl) to a GSM (Unix) style file name (e.g. 01SVL_BACRES).

2. Select one of the BACNAT image files within the Unix directory on the CD. The BACNAT image files are named:

   name_v.vvv

   where *name* is the name of the Unix operating system (e.g. SCO, AIX, HPUX etc.) and *v.vvv* is the BACNAT version number (e.g. 3.300). For example:

   SCO_3.300

The name part of the BACNAT image file should be self-evident. In general, if more than one BACNAT version number is available, always select the highest version (e.g. SCO_3.300 should be used instead of SCO_3.298).

Throughout the rest of this document, SCO_3.300 will be used as the example BACNAT image file.

6.4 Pre-Installation

After the manual file transfer phase the work directory on the "target" Unix file server should contain:

```
GSM260\
SCO_3.300
```

Use the Unix tar command to extract the glinstall script from the BACNAT image file:

```
tar xvf SCO_3.300 glinstall
```

The work directory on the "target" Unix file server should now contain:

```
GSM260\
SCO_3.300
glinstall
```

6.5 Installation

Run the glinstall script to commence the GSM (Unix) installation:

```
./glinstall -i SCO_3.300
```

Note the use of the -i command line option to specify the name of the BACNAT image file.

The glinstall installation script will meld the GSM260 directory into the GSM (Unix) directory structure, renaming GSM260 to A60.dir.

Appendix A - GSM (Unix) T151Z and T259Z

This appendix describes the ramifications of switching a GSM (Unix) configuration from Volume Format T151Z to T259Z.

A.1 Background

For a variety of historical reasons the various non-BOS GSM configurations that support SSD/DDF controllers have been configured with different SSD Volume Formats:

Host o/s	T224Z	T151Z	T259Z
Unix	Original format, but limited to 99 files per directory	250 file replacement for T224Z	Supported in BACNAT V3.223 (June 1996); Introduced with BACNAT V3.298 (Sept-2002)
DOS/Novell	Never used	Original format (250 files) but only allows up to 512Mb	Replacement format (1994) that allows up to 2Gb
Windows	Never used	Never used	Allows 250 files and up to 2Gb

With the Sept-2002 rationalisation of the software generation procedure for 32-bit versions of GSM (i.e. Windows, Unix and Novell) it has been necessary to define a common SSD Volume Format for all 3 versions of GSM. The requirement for a common SSD format is also a pre-requisite for further planned improvements to the Software Generation and Installation procedures.

Volume Format T259Z has been selected as the common format. This decision has some ramifications for GSM (Unix) configurations.

A.2 Differences Between T151Z and T259Z

In the current version of the File Executive, each SSD/DDF volume simulates a physical hard-disk drive. The File Executive calculates "disk positions" based on sectors, tracks and heads. Therefore each simulated Volume Format requires a virtual disk-geometry. Note that this requirement to simulate a physical disk is removed by the "open files" File Executive.

The virtual disk geometry for Volume Formats T151Z and T259Z impose the following conditions on the Domain Header File (e.g. 00SYSDOM.svl) and Sub-Volume Files (e.g. 01SYSRES.SVL) that make up the simulated volume.

File type	T151Z	T259Z
Domain Header File	Must be **exactly** 32kB	Must be **exactly** 64Kb
Sub-Volume File	Must be an exact **multiple** of 8Kb	Must be an exact **multiple** of 32Kb

A.3 Support in GSM (Unix) for T259Z

A.3.1 BACNAT V3.223

The initial support for Volume Format T159Z on GSM (Unix) was completed in May-1996 (BACNAT V3.223). The actual changes were:

- The Unix SSD controller was enhanced to validate the sizes of the various Sub-Volume Files based on the Volume Format (i.e. multiple of 8Kb for T151Z; multiple of 32Kb for T259Z;

- The Unix SSD controller was enhanced to recognise a 64Kb Domain Header File and validates the size of the Domain Header File based on the Volume Format (i.e. 32Kb for T151Z; 64Kb for T259Z;

- The *glmkdat* utility was enhanced to recognise the -r option. When this option is used *glmkdat* creates a T259Z format Domain Header File;

- The *glreorg* utility was enhanced to recognise the -r option. When this option is used *glreorg* rounds all Sub-Volume files to an exact multiple of 32Kb (T259Z) rather than 8Kb (T151Z). Note that *glreorg*, which was written as a "damaged file recovery" utility rather than an upgrade utility, **never** changes the size of the Domain Header File.

All the above changes allow a T259Z GSM (Unix) configuration to be "carefully" constructed by hand.

A.3.2 BACNAT V3.299

The support for Volume Format T159Z on GSM (Unix) was improved in Sept-2002 (BACNAT V3.299) by the introduction of the *glt259z* utility. *glt259z*, which operates on an SSD directory, or directories (cf. *glreorg* which operates on Sub-Volume file(s)), converts an entire T151Z SSD directory to T259Z standards by rounding up the sizes of the Sub-Volume Files from 8kB to 32Kb **and** converting the Domain Header File from 32Kb to 64kb.

Although it is tempting to perform this T151Z to T259Z conversion automatically in the GSM (Unix) SSD controller when GSM starts-up, a once-only utility (i.e. *glt259z*) which is run explicitly, and allows backups to be taken prior to the upgrade, is considered a safer option.

A.4 Recommendations for upgrading to a T259Z GSM (Unix) system

This general procedure should be followed when upgrading a "T151Z" GSM (Unix) system, installed from DAT tape, QIC tape or diskette, to a "T259Z" GSM (Unix) system installed from CD. This assumes that the existing GSM (Unix) system is installed in directory /u/global.

1. Use mvdir to rename /u/global to /u/global-old, for example;

2. Install the "T259Z" system into the /u/global directory. This will create both A00.dir and A60.dir SSD directories and install a fresh Systems file;

3. Restore the original Systems file from /u/global-old/sys/ to /u/global/sys/ and re-run glconfig to rebuild the Systems file;

4. For any server directories "B" to "Z" (e.g. B00.dir, C00.dir etc.) that were located under /u/global, move the relevant directory (e.g. B00.dir) from /u/global-old/data to /u/global/data.

5. For **ALL** server directories "B" to "Z" (e.g. B00.dir, C00.dir etc.), regardless of their location, run glt259z to upgrade from T151Z format to T259Z format. For example:

```
glt259z /u/global/data/B00.dir
```

6. To restore "T151Z" Sub-Volume files from an existing "T151Z" A00.dir or A60.dir directory (e.g. /u/global-old/data/A00.dir) to a freshly installed "T259Z" directory (e.g. /u/global/data/A00.dir), copy the required Sub-Volume Files and run glreorg to round the sizes up to an exact multiple of 32Kb. For example:

```
glreorg -r /u/global/data/A00.dir/*
```

7. If it is ever required to create new filing systems, ensure the glmkdat -r option is used. For example:

```
glmkdat -r /u/global/data/Z00.dir
```