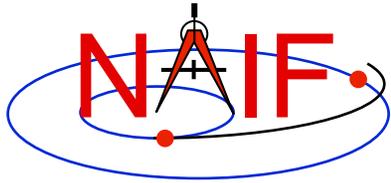


Navigation and Ancillary Information Facility

Porting Kernels

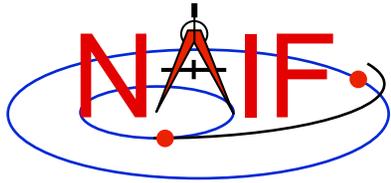
January 2012



Porting Issues - 1

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- **Data formats vary across platforms, so data files created on platform “X” may not be usable on platform “Y.”**
 - **Binary formats:** different platforms use different bit patterns to represent numbers (and possibly characters).
 - **Text formats:** different platforms use different mechanisms to represent “lines” in text files.
 - › Usually a “line terminator character sequence” indicates end-of-line.
- **We say two platforms have “compatible” binary or text formats if they use the same binary or text data representations.**
- **We say that a file is “native” if its format is the same as that used on the computer you are using.**



Porting Issues - 2

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- Toolkit software **can often** read kernels obtained from an incompatible platform
 - Binary SPK, CK, or PCK kernels from one system can be read on an incompatible system (e.g. any pair of PC, Mac, Sun).
 - Text kernels from one system can be read on an incompatible system (e.g. any pair of PC, Mac, Sun) when using a C, IDL or MATLAB toolkit.
- The Toolkit **cannot** read certain kernels from incompatible platforms
 - **Text kernels, if using a FORTAN toolkit**
 - **DAS-based files, such as E-kernels (ESQ) or shape model kernels (DSK)**



Porting Issues - 3

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- **When conversion to native format is required to make the kernel usable, several options are available.**
 - Use *bingo* for both binary and text kernels
 - › Available only from the NAIF website; not provided in Toolkit packages
 - For text kernels, doing your file download using ftp in ASCII mode will perform the required format conversion on the fly.
 - Web browsers often do text format conversion.
 - › However ASCII mode may not be available – sftp clients usually don't provide it. In such cases other tools such as dos2unix and unix2dos, or bingo, must be used.
 - For binary kernels, the SPICE *toxfr* and *tobin* tools may be used to convert files to and from SPICE transfer format
 - › This is an ASCII-based format that may be transferred in the same way as other ASCII files.

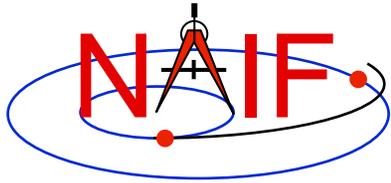


Compatible Environments for **Text** Kernels

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Since text kernels are only text files...

	<u>Groupings of Text Compatible Environments</u>	<u>End of line indicator</u>
1	PC using Windows or N T	<CR><LF>
2	Unix PC with LINUX Macintosh OSX (Motorola or Intel chip)	<LF>



Compatible Environments for Binary Kernels

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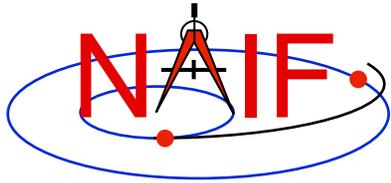
	<u>Groupings of Binary Compatible Environments</u>	<u>Binary Representation</u>
1	PC/ Windows PC/Linux Mac Pro (Intel chip) (the new ones)	IEEE - Little endian
2	Sun Mac Power PC (Motorola chip)	IEEE - Big endian



Caution Using Email

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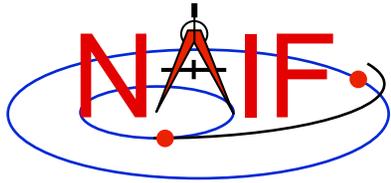
- **NAIF recommends against the use of email to transfer kernels...**
...unless previous tests have already proven successful using the same conditions/computers intended for current use. Possible causes of problems are:
 - incompatible binary or text representations (as already discussed).
 - an attachment size limit somewhere in the e-mail chain.
 - the sender's or recipient's mail client modifies the kernel based on file name or presumed content.
- **When you must email kernels, compress them either with zip, or gzip (or stuffit), then send the compressed file as an email attachment.**



Binary Kernels - Caveats

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- If the kernel you are using is a non-native binary kernel you can read this file but you may not write data to this file.
 - You **can read** most non-native binary kernels using the automatic run-time conversion capability found in the APIs of modern Toolkits.
 - You **cannot write** information into the comment area, or delete information from the comment area.
 - You **cannot append** additional data to the kernel.
- Run-time conversion does not work for E-kernel (ESQ) or shape model (DSK) kernels.
 - More generally, it does not yet work for any file built upon the SPICE “DAS” architecture.



Binary Kernels Allowed Operations

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- You may “load” and read both non-native and native binary kernels in the same runtime instance
- You may merge any combination of native and non-native SPK files
 - The resultant, merged SPK file will be in native format