Cafe SDK Release Notes

NINTENDO CONFIDENTIAL PROPRIETARY

2015 June   **SDK Version 2.12.13 Latest Update**

Introduction

This is a main-line release of the Cafe Software Development Kit.

To install the SDK, start by unzipping the base SDK package to a new location on your host PC, and then unzipping the Docs patch on top of it. Then refer to the MAN pages at `manual.html` in your installation, and then navigate to *Cafe SDK Basics → CAT-DEV QuickStart Guide* to continue setting up and using the SDK.

This SDK is intended for licensed game and application developers only.

Document Conventions

This document is organized by functional subsystem. Each subsystem is further subdivided into **New Features & Changes**, **Bug Fixes**, and **Known Issues**.

The following table shows the tags that are used to identify the importance of an issue.

Icon	Meaning
⚑	A **CAUTION**.
✖	A **BREAKING CHANGE**. As the SDK continues to evolve, some changes may break existing applications. We regret the inconvenience.
[x]	An internal issue tracking identifier.

When referring to the MAN pages in these release notes, a ***bold*** title name means that you should open the named section by clicking on the arrow icon to expose its subsections. For more details, please see *HOW TO USE* in the MAN pages.

We hope this presentation improves the readability of this document, and we welcome your feedback.

Supported Platforms

This SDK officially supports the following Cafe Tool for Development ("CAT-DEV") hardware systems:

- CAT-DEV MP (default)
- CAT-R MP

For more information about MP systems, please see the CAT-DEV release notes (catdev_release_notes.pdf).

For more information about CAT-R systems, please see the *CAT-R QuickStart Guide*..

Requirements and Dependencies

The following table lists SDK components and their dependencies.

Component	Requires	Version
SDK 2.12.13 Latest Update	Host Operating System	Windows 7 Service Pack 1 64-bit Edition
	Microsoft .NET Framework	.NET Framework 4.0 (Full)
	Visual C++ Redistributable Package	Visual C++ 2010 SP1 Redistributable Package (x64)
	Green Hills Software MULTI Tool Chain	5.3.22 or later as noted
	Boot Firmware	2.11.10M
CAT-DEV	Host Bridge Software	3.2.6.1, or later as noted
CAT-DEV	Host Bridge Firmware	0.0.14.74, or later as noted

Installing the MULTI Tool Chain

To install the Green Hills Software MULTI tool chain, please see *Cafe SDK Basics → CAT-DEV QuickStart Guide → Set Up Environment → Install the MULTI Tool Chain* in the MAN pages.

Installing the Host Bridge Software and Firmware

To install the Host Bridge Software, please see *Cafe SDK Basics → CAT-DEV QuickStart Guide → Set Up Environment → Set Up the CAT-DEV* in the MAN pages.

Updating the CAT-DEV

To update your CAT-DEV to this SDK, please use the `cafeupdate` command.

* For more details, please see *Cafe SDK Basics → Development Cycle → Update Environment → CAT-DEV System Update* in the MAN pages.

Subsystem Release Notes

Green Hills Software MULTI Release Notes

For the release notes for MULTI for Nintendo from Green Hills Software, please see these documents in the root of its installation package:

```
MULTI-<version>\MULTI for Nintendo Release Notes.pdf

MULTI-<version>\release_notes_ppc.pdf
```

where *<version>* is the GHS MULTI version, such as `5_3_22`.

For answers to frequently asked questions about MULTI for Nintendo, please see this document in the root of its installation package:

```
MULTI-<version>\MULTI for Nintendo FAQ.pdf
```

GX2 and GPU7 Graphics Core Release Notes

For the GX2 and the GPU7 graphics core release notes, please refer to the following MAN page in the SDK:

```
$CAFE_ROOT/system/docs/man/en_us/gx2/html2/gx2releasenotespage.html
```

nn Library Release Notes

For the Auto Connection, Nintendo Account, Friends Presence, SpotPass, Profanity Filtering, Software Keyboard, Error Viewer, NFP, and Temporary Directory release notes, please refer to the following MAN page in the SDK:

```
$CAFE_ROOT/system/docs/man/en_us/nn/public/API/html/release_notes.html
```

Table of Contents

1. Known Issues

This section summarizes the known issues in this SDK by subsystem. For more details, please follow the links to the detailed descriptions for each issue.

System Performance

Do not use the `dcbt` (data cache block touch) instruction.

Locked Cache DMA and Code Execution.

System performance may vary between SDKs.

Instruction Cache Intervention for the main application processor is disabled.

64B Prefetch Disabled When Locked Cache DMA is used on a particular core.

System Update

[10650] Do not update from SDK 2.06 or 2.07 to the latest SDK using a disc update.

[9559] After you install SDK 2.11.01, an attempt to run SDK 2.09.xx will fail.

Update of boot1 will fail when there are multiple directories under the update directory.

[4710] Do not update to a different SDK when in NAND mode.

Dev Kit Tools and Functions

[11735] Do not install the SDK in a directory with a long path name.

[11520] `preprpl` can fail with a segmentation fault when a very large `.def` file contains Unix-style line endings.

[10973] The capability to kill and quickly restart an application does not work if an application has already exited or crashed.

[10660] In NAND boot mode, a `cafestop` command is required between instances of `caferun`.

[11167] In PCFS boot mode, a `cafestop` command may be required between instances of `caferun` in some circumstances.

[11168] Rarely, the Windows host system may crash on a cafex run command.

[10316,11150] An application's RPL files and any middleware it uses must all be built with the same version of the SDK as the application's RPX file.

[9621] With the latest Cygwin installed, pressing Ctrl-C when a title is running in a Cafe command window causes the command prompt to hang for about a minute.

Avoid using the standard C library function `realloc`.

The `caferun` command may choose any title instance to run when multiple titles with the same title ID are installed.

[6970] Disc updating to SDK 2.09.02 fails the first time it is attempted in Development mode, always in Production mode.

[5512] How to estimate code area usage.

MULTI Compiler/Linker Tool Chain and Debugger

[9668] When a crash happens due to `OSPanic`, MULTI does not select the crashing `OSPanic` line upon launching.

Cafe OS

[11588] In very rare cases when loading an RPX or RPL, the system may panic.

[11200] If an RPL or RPX is an exact multiple of 4MB in size, the file may fail to load with error 160-2224.

[8951] Do not set thread affinity to `OS_THREAD_ATTR_AFFINITY_NONE` for any thread that may make a call to any `OSDynLoad*` function.

[10697] If an RPL erroneously has its own `main` function, then C++ constructors are called twice.

[5972] If a main application is in the background, a thread that runs continuously and does not wait on any blocking synchronization objects may cause a foreground switch to stall until this thread eventually blocks.

[6447] Application code and data layout may differ between SDK versions.

[4139] Issues with C++ exceptions.

[4283] Do not access I/O request buffers after the corresponding I/O request has been started and before it has completed.

⚑ [5460] Issues with Cafe OS runtime memory overhead.

⚑ Threads affinitized to more than one core that use floating point take a performance hit when rescheduled.

⚑ Issues with `libc malloc` performance.

Graphics and Video

[8345] In the `drc/cameramic` demo, a buffer underflow error may appear after repeatedly closing and re-opening the camera.

[8837] Calling the `GX2SetPixelSamplerBorderColor`, `GX2SetVertexSamplerBorderColor`, `GX2SetGeometrySamplerBorderColor`, or `GX2SetComputeSamplerBorderColor` functions too frequently will result in a performance loss.

[3447] Noise may occur in the camera image if you change camera parameters while the camera is running.

[11417] Image corruption occurs at application shutdown if the application calls either of the `GX2Set{TV,DRC}Enable(GX2_FALSE)` functions from Core 0 before it releases foreground.

[11143] The GamePad camera and mic do not work if the real **HOME** Button menu is installed with the Wii U menu changer and application is launched with the `make run` command.

⚑ Many of the SDK demos depend on building the textures and shaders first.

Sound and Audio

[11020] When debugging a program using a debugger, it is possible for an AX voice to be dropped, especially when debugging audio callbacks.

[10611] In the MIX library, no sound is produced when both the initialized and new user-specified fader value are set to 0db.

[10951] Transition audio is played when starting a new process or when rebooting; during this time it is possible for a heartbeat failure to occur.

[8151] The Sound-1 library may produce different output for the PPC and DSP renderers.

Game PADs (DRC, Wii Remotes, etc.)

Audio noise may occur on the DRC in a bad wireless environment.

[10600] You are unable to update the firmware of a second GamePad when **Wii U GamePad (DRC) Setting** → **Multi DRC** is set to **ON** in System Config Tool.

⚑ The DRC Touch Screen may return a coordinate different from the touched location.

⚑ `VPADRead` may not return an error even if the DRC becomes disconnected during a system transition.

Network

[6048] Initial association fails for certain older routers when they are configured as WPA2 PSK AES.

WPS fails with certain older routers.

Mastering

⚑ Do not use the preloading feature with disc titles.

2. System Performance

Known Issues

Do not use the `dcbt` (data cache block touch) instruction.

- Espresso does not allow more than one outstanding data miss per core. If the prefetch generates a cache miss, a subsequent load/store that misses the cache will have to wait until the prefetch is done. With Espresso's 6-entry completion queue and the long latency to MEM2, the prefetching is unlikely to be effective. A normal load/store to demand fetch the data will often be a better choice.
- Likewise, avoid using the `DCTouchRange` function. With only one data miss outstanding, a loop of `dcbt` instructions will not allow data prefetching and computation to overlap.

Locked Cache DMA and Code Execution.

- While the LCDMA feature is presented through an asynchronous set of functions, the CPU core will busy wait until the DMA completes.

- This is a workaround for a hardware issue present in all versions of the main application processor.
- Despite this workaround, a dramatic performance gain is still possible for LCDMA-based streaming code.

System performance may vary between SDKs.

- Performance optimization of the operating system and drivers continues. Some aspects of performance may worsen before they improve, because new features are matured and stabilized before they are tuned. These activities may span SDK releases.

Instruction Cache Intervention for the main application processor is disabled.

- This feature will not be available on the Cafe platform.

64B Prefetch Disabled When Locked Cache DMA is used on a particular core.

- This is a hardware bug that affects V4 and MP CAT-DEV platforms.
- This workaround will be removed for all hardware in a future SDK.

3. System Update

Known Issues

[10650] Do not update from SDK 2.06 or 2.07 to the latest SDK using a disc update.

- Instead, use the existing instructions for the appropriate platform in the MAN pages.

[9559] After you install SDK 2.11.01, an attempt to run SDK 2.09.xx will fail.

- As a workaround, run the "`cafex revert <target-sdk-root>`" command.
- For more details, please see the *CafeX: revert command* page in the MAN pages.

Update of boot1 will fail when there are multiple directories under the update directory.

- The default update directory is `$CAFE_ROOT\data\mlc\sys\update\pcfs`.
- The failure message is:

  `Update /vol/storage_hfiomlc01/sys/update/pcfs Failed: -262146`

- To resolve this issue, please delete any directories under `$CAFE_ROOT\data\mlc\sys\update\pcfs` which are not originally packaged in the SDK.

[4710] Do not update to a different SDK when in NAND mode.

- You must be in PCFS mode to switch SDKs.
- For more details, please see **Cafe SDK Basics** → **Development Cycle** → **Run Applications** → *Environment Settings* → *Cafe Operating Modes* → *Boot Modes* in the MAN pages.

SDK 2.12.04

New Features & Changes

[11277] SDK 2.12.04 includes new DRC/DRH firmware version 25.12. Please be sure to update your DRC.

SDK 2.12.02

New Features & Changes

Host Bridge Software version 3.2.6.1 is now required, along with corresponding Host Bridge Firmware version 0.0.14.74.

SDK 2.12.00

New Features & Changes

[10057] The bootloader has been updated to version 2.11.10M.

4. Dev Kit Tools and Functions

Known Issues

[11735] Do not install the SDK in a directory with a long path name.

- This can cause the SDK installation or builds to exceed the maximum Windows path length.

[11520] `preprpl` can fail with a segmentation fault when a very large `.def` file contains Unix-style line endings.

- In rare cases, a very large `.def` file with Unix-style line endings (LF rather than CRLF) may cause `preprpl` to fail with a segmentation fault.
- As a workaround, please convert the line endings to Windows-style (CRLF).

[10973] The capability to kill and quickly restart an application does not work if an application has already exited or crashed.

- For example, it does not work with self-terminating demos like `helloworld` once they have exited.
- As a workaround, the application must be restarted from the beginning.

[10660] In NAND boot mode, a `cafestop` command is required between instances of `caferun`.

- Without the `cafestop` command, the second `caferun` command runs the program specified by the first `caferun` command.
- A `cafestop` command is also required when attempting to restart in MULTI.

[11167] In PCFS boot mode, a `cafestop` command may be required between instances of `caferun` in some circumstances.

- In some circumstances, a second or subsequent `caferun` command may fail with the following log message:

  `PCFS: No response from PCFSServer, PCFS file system is unavailable!`

- A workaround is to enter a `cafestop` command between `caferun` commands.

[11168] Rarely, the Windows host system may crash on a cafex run command.

[10316,11150] An application's RPL files and any middleware it uses must all be built with the same version of the SDK as the application's RPX file.

- One known case is if the middleware is creating/managing GX2 display lists or GX2 contexts. This prevents potential memory corruption issues from occurring. But there are also other cases.

[9621] With the latest Cygwin installed, pressing Ctrl-C when a title is running in a Cafe command window causes the command prompt to hang for about a minute.

- This is a problem with recent releases of Cygwin.
- As a workaround, follow these steps:
  1. Open a second Cafe window. (Do not type Ctrl-C in the first window.)
  2. In the second Cafe window, type `cafestop`.
- The `cafestop` command will terminate the application and control will return back to the first Cafe window.

Avoid using the standard C library function `realloc`.

- Using the implementation of `realloc` in the Cafe SDK may significantly degrade performance.
- Developers should optimize their use of memory themselves so that calling `realloc` is rarely or never required.
- There is no plan to improve the implementation of `realloc` in the future.
- The source code for the Cafe SDK implementation can be found here:

  `$CAFE_ROOT/system/src/lib/def_malloc/cos_def_malloc.c`

The `caferun` command may choose any title instance to run when multiple titles with the same title ID are installed.

- The search order depends on a number of factors that are not necessarily repeatable, including storage device attachment order.
- To run a specific instance of a title, please include the following option to `caferun`, selecting the desired device:

  `-e mcp:launch_hint:{hfiomlc,odd,mlc,hfiodisc}`

[6970] Disc updating to SDK 2.09.02 fails the first time it is attempted in Development mode, always in Production mode.

- If you burn an update disc with SDK 2.09.02 and try to perform an update from that disc, the system will crash just after Stage 0. In Development mode, if the system is powered down and restarted, the next update will succeed. In Production mode, the update will continue to fail.
- This failure is caused by the inclusion of the production updater and updater OS in SDK 2.09.02. On systems to be updated, the deprecated development updater and development updater OS are installed on the system. When the update is performed, the system does not know which updater to use and can pick the wrong one.

- The workaround for this failure is to run the update twice; or to avoid the crash, run Devmenu or System Config Tool and uninstall the old updater using the following steps:
  - In a `cafe.bat` window, run `cafeon`.
  - On the Game Pad, set the **System Mode** to **Development** if necessary:
    - **System Information** → **System Mode** → **Development** in Devmenu.
    - **Boot Configuration** → **System Mode** → **Development** in System Config Tool.
  - Use one of the following two methods; the second method avoids the crash:
    - Perform the update once, causing a crash, and then perform the update a second time.
    - Uninstall the development updater, and then perform the update. To uninstall the development updater:
      - On the Game Pad, navigate to **Title Manager** → **Launcher**.
      - Scroll down to the title with title ID **00050010100040FF**.
      - Press the **A** button to select this title.
      - Press the **Y** button to delete this title.
- On SDK 2.08.01, Devmenu resets the settings to English and 49, respectively.
- On SDK 2.07.03 and 2.08.02, Devmenu resets the settings to Japanese and 0, respectively.
- This issue does not affect production games because the Wii U menu sets the language and country ID.
- Developers may need to change the settings after system initialization, using the system config tool.

[5512] How to estimate code area usage.

- The only reliable way to estimate code area usage is to run the application, call `OSDynLoad_GetLoaderHeapStatistics`, and report the value of `mCodeHeap_MemBytesUsed`.
- Then pad that value by about 15% to account for temporary space used while processing relocations.
- For more details, please see the corresponding MAN page.

SDK 2.12.13 Latest Update

New Features & Changes

[11726] The MAN pages have been updated to reflect that the more recent Cygwin `make` 4.0-2 has been tested with the SDK.

- For more details, please see **Cafe SDK Basics** → **CAT-DEV QuickStart Guide** → **Use Your CAT-DEV** → *Build SDK Demos* → *Installing Cygwin*, and follow the link to Install Cygwin.

[11603] The MAN pages have been updated to reflect that disconnecting the Ethernet cable from a CAT-DEV will automatically place the CAT-DEV in headless mode.

- For more details, please see *Cafe SDK Basics* → *Development Cycle* → *Run Applications* → *Configure Standalone Mode* in the MAN pages.

[8390][11608] The MAN pages have been further updated with many editorial fixes for spelling, grammar, MAN page conventions, and links.

Bug Fixes

[11760] On repeated runs of a wumad, the extraction tool `makewumaddlf` now verifies checksums before deciding to extract files again.

[11553] As a failsafe, `cafex` will cold boot the system if Cafe OS does not respond to a soft launch command.

[11554] `cafex` tried to access `CAFE_META_DIR` when it did not exist.

[11748] The `viewcore` program did not correctly process crash dump files that used non-default code heap size.

[CFENET-8725] The MAN page for the System Config Tool's boot settings has been clarified to indicate that 2GB of application memory is optionally available when a CAT-DEV is in **Production** mode.

- For more details, **Cafe SDK Basics** → **System Configuration Tool** → Boot Configuration in the MAN pages.

[9714] When `cafex` needs to delete directories within the SDK it will now remove the read-only attribute if necessary.

[11354] Updating a CAT-DEV while in NAND mode is now blocked. A CAT-DEV must be in PCFS mode before updating.

[10851] `cafex` no longer corrupts its output when printing Shift JIS characters.

[11251] When running `cafediscrun` and the eject state is not specified, `cafex` will automatically set the eject state to `in`.

- Also, performance has been improved when setting the eject state.
- This improvement requires Host Bridge 3.2.6.8 in addition to SDK 2.12.13 Latest Update.

[11743] The MAN page for the `OSResetEvent` function has been corrected to indicate that this function is thread-safe.

[11749] The MAN page for the `OSGetDefaultThread` function has been corrected to describe its operation.

SDK 2.12.13 20150302 Update

New Features & Changes

[8390][11608] The MAN pages have been updated with many editorial fixes for spelling, grammar, MAN page conventions, and links.

SDK 2.12.12

New Features & Changes

[11537] A warning message is now displayed when starting `cafe.bat`, `cafe_env.bat`, `multi_cafe.bat`, `multi_cafex.bat`, or `cafex` if system applications are missing from the directory specified by the CAFE_MLC_DIR environment variable.

Bug Fixes

✖ [CFENET-8332] In the System Config Tool, import and export of network settings failed when NAND boot mode was set.

- Note: System Config Tool export data that was created prior to this SDK is no longer compatible with this fix. Please re-recreate your export data.

[CFENET-8561] The System Config Tool stopped importing save data if the save data had a particular structure.

[CFENET-6588] The System Config Tool would fail to save network settings if the IP address was not changed from 0.0.0.0.

- The System Config Tool now uses a dummy value.

[CFENET-8473] The System Config Tool failed to save settings if it had not yet created a config file.

- The config file is now created if it does not exist.

[11510][11511][11516] Launch and relaunch stability in `cafex` has been improved when the CAT-DEV is in NAND boot mode.

- This fix also improves the interaction with the MULTI debugger,

SDK 2.12.11

Bug Fixes

[CFENET-8409] On the CAT-R, the System Config Tool no longer offers the option to select 2GB for application memory size in the **Boot Configuration** menu.

- Since the CAT-R has a fixed 1GB for application memory, a 2GB option is not applicable.

[10973] Performance and stability in `cafex` has been improved in the area of program kill/restart.

[11458] You can now override the default values of the `CAFE_CONTENT_DIR`, `CAFE_SAVE_DIR`, `CAFE_MLC_DIR`, and `CAFE_SLC_DIR` environment variables in a multi-session Cafe environment.

[CFENET-8454] The System Config Tool documentation now describes how to view save data in system NAND by moving it to emulated NAND.

- For more details, please see *Cafe SDK Basics → System Configuration Tool → Data Manager → Save Data Manager* in the MAN pages.

[CFENET-8463] The documentation for the System Config Tool has been updated to clarify that the -c option is only available in PCFS mode.

- For more details, please see *Cafe SDK Basics → System Configuration Tool → Run and Use the Tool* in the MAN pages.

SDK 2.12.04

New Features & Changes

[CFENET-8271] The System Config Tool can now create the initial save data for some system applications.

- For more details, please see *Cafe SDK Basics → System Configuration Tool → Data Manager → Save Data Manager → Create Initial System Application Save Data* in the MAN pages.

[CFENET-8221] The System Config Tool's **Software Version Information** menu now displays the SDK version of the running OS in addition to the version of the SDK that was used to build the System Config Tool itself.

- Previously, the menu displayed only the version of the System Config Tool.

[CFENET-8135] The System Config Tool can now export and import save data from its command line interface.

- For more details, please see *Cafe SDK Basics → System Config Tool → Command Line Options →* `export_save` and `import_save` in the MAN pages.

[CFENET-8135] The System Config Tool can now display the command history using the entire screen.

- For more details, please see *Cafe SDK Basics → System Config Tool → Command Line Options →* `history` in the MAN pages.

[CFENET-8326] The System Config Tool can now delete NFC tag backup data using the **Data Manager → Save Data Management** menu.

[CFENET-8344] When you launch an application with the System Config Tool for which you checked **Application Information → Partition Information → Save Data/Boss Data Information → Create Save Data with Launcher** in the Application Configuration Tool, 9MB will be allocated for the NFC tag backup area.

Bug Fixes

[11086] The multi-Cafe environment now honors a user-defined `CAFE_META_DIR` environment variable.

- For more details, please see *Create an Application → Preparing Your Application → Application Configuration → Application Configuration in Meta Directory* in the MAN pages.

[CFENET-8137] When exporting save data via the System Config Tool, empty save data was generated by exporting save data that should be found only in Boss storage and should not be exported in the first place.

[CFENET-8197] In the System Config Tool, device names were not displayed properly in the **System Titles Viewer** menu

[6254] The *CAT-R QuickStart Guide* has been updated with a list of limitations on its correct usage.

SDK 2.12.03

Bug Fixes

[CFENET-7975] The System Config Tool now permits spaces when entering a wireless network access security key in **Network Settings**.

[CFENET-7869] The System Config Tool is no longer able to encrypt and then export save data.

- Save data encrypted and then exported using this feature should be decrypted by using the System Config Tool in SDK 2.12.02.

SDK 2.12.02

Bug Fixes

[CFENET-7145] When installing a title using the System Config Tool, if the version of the installed title is older than that of the same title ID, a warning is issued.

[11100] The `cafex run -t` command now correctly detects invalid characters in the title ID.

[11109] The System Config Tool did not properly set the DRH state, causing the GamePad camera and mic to fail in an application that was launched directly by the System Config Tool.

[11108] `examplemake` demos displayed errors when built externally under `cygwin.bat`.

- `preprpl` and `makerpl` both require an environment variable named `GHS_ROOT` when an import library is required. An export of that variable has been added in each of the `examplemake makefile`s.

SDK 2.12.01

Bug Fixes

[10181,10665,10627] `cafex` now returns an application's exit code when using `cafex run`, `cafex discrun`, or `cafex on`.

- Also fixed were some cases in which other, non-application errors in `cafex` would return an exit code of 0.

SDK 2.12.00

New Features & Changes

[10105] The `cafex update` and `cafeupdate` commands now attempt to update the firmware of the DRC connected to the DRC1 port.

- The DRC must already be paired with the system in order for this to succeed.
- To opt out of this update, specify the `-nodrc` option after the `update` command.
- Also, the System Configuration Tool now supports the `drc_update` command, which updates the DRC firmware.
  - Usage: `drc_update <n>`, where `<n>` = 1 or 2, depending on the slot that the DRC is connected to.
- For more details, please see *Cafe SDK Basics → Development Cycle → Run Applications → Tools to Run Applications → cafex → Overview → update* in the MAN pages.

Bug Fixes

Several displays in the System Config Tool have been updated:

- [CFENET-6589] The **Connection Test** under the **Network Setting** menu now displays the name of an error at the time of failure.
- [CFENET-6753] The display of storage size in the **Data Management** menu has been improved.
- [CFENET-7024] In the **Save Data Management** menu of the **Data Management** menu, the byte value shown was incorrect when there was no free space left.

[10828] In the System Config Tool, the DRC could not be paired using the **SYNC** button on console if 4 Wii Remotes were connected.

[10502] `cafex` would occasionally report the following error:

```
cafex : Warning! mionps tool returned code 17.
mionps stdout and stderr received:
mionps: INFO: [03/12/2014 10:06:57.032] ERROR: unexpected read size waiting for read
success, size=60
```

[10931] When launching a wumad, `cafex` now sets the launch hint to ODD so that another title installed elsewhere, but with the same title ID, will not be launched instead.

- For more details, please see *Cafe SDK Basics → Development Cycle → Run Applications → Tools to Run Applications → cafex → Overview → discrun → Host PC Hard-disk Based Emulation* in the MAN pages.

5. MULTI Compiler/Linker Tool Chain and Debugger

Known Issues

[9668] When a crash happens due to `OSPanic`, MULTI does not select the crashing `OSPanic` line upon launching.

- You can locate the offending line, or its caller, by examining the call stack. This can be done by clicking the "call stack" button in MULTI.
  - If the `OSPanic` occurs with "`make run`": The call stack shows the caller to the function where `OSPanic` happens. The caller function should be a level immediately above a system function.
  - If the `OSPanic` occurs with "`make multirun`": The call stack shows the system function `__OSPanic()` as the crash point. The user function that caused the crash should be immediately above the system function `OSPanic()`.

SDK 2.12.11

Bug Fixes

[11403] The `memdump` command and related bulk debugger transfers have been improved.

- All communication between the console and the MULTI debugger over the EXI debug channel is now about 5x faster.
- This includes the `memdump` command.

SDK 2.12.00

New Features & Changes

[10401] Single-step debugger performance has been significantly improved when there are memory view windows open.

6. Cafe OS

Known Issues

[11588] In very rare cases when loading an RPX or RPL, the system may panic.

- The loader returns most errors to the kernel or the application if an error occurs while loading an RPX or RPL.
- When the application does not get the error, in most cases the system shows the appropriate error display, but there are some very rare cases in which the system panics.

[11200] If an RPL or RPX is an exact multiple of 4MB in size, the file may fail to load with error 160-2224.

- This can occur in rare cases if an RPL is an exact multiple of 4MB in size, and depending on RPL load order (it's not loaded last).
- For RPLs that are statically requested by an RPX, the load order is fixed. So if this issue did not occur during testing, it can never occur in production.
- For RPLs that are dynamically loaded at runtime, the order may depend on the game's actions, thread scheduling, etc. So if the bug did not occur during testing, there is still a small probability that it could occur later in a specific run, including in production.
- A workaround is to add or remove 1 byte from the RPL or RPX so that its size is no longer an exact multiple of 4MB.

[8951] Do not set thread affinity to `OS_THREAD_ATTR_AFFINITY_NONE` for any thread that may make a call to any `OSDynLoad*` function.

- Loading an RPL can fail if the calling thread has affinity `OS_THREAD_ATTR_AFFINITY_NONE`.

[10697] If an RPL erroneously has its own `main` function, then C++ constructors are called twice.

- If an application uses C++, and it also uses an RPL that has its own `main` function in addition to the RPX's main function, then C++ constructors are called twice.
- An RPL should not have its own `main` function but the `makerpl` tool does not check for this.
- There are two possible workarounds:
  1. Change the name of the RPL's `main` function to something else.
  2. Use the MULTI compiler option `--disable_ctors_dtors` when building the RPL. This option tells the compiler to omit the call to `_main` at the beginning of the RPL's `main` function The static initializers are still created, but they will only be called once from the RPX's `main` function.
- This will be resolved in a future SDK release.

[5972] If a main application is in the background, a thread that runs continuously and does not wait on any blocking synchronization objects may cause a foreground switch to stall until this thread eventually blocks.

- This is most commonly seen when returning from the Home Button Menu to the main application.

[6447] Application code and data layout may differ between SDK versions.

- For example, developers should not make any of the following assumptions when comparing a session run on one release of the SDK with a session run on a different release of the SDK:
  - that raw pointer addresses stored during the first session will be valid during the second session;
  - that corresponding allocations from the heap will be at the same addresses;
  - or that the RPX and the RPLs that it uses will be loaded at the same addresses.
- Please audit your software to ensure that there are no assumptions about code or data start addresses.
- If you find that your software does make such assumptions, please contact Nintendo Developer Support immediately.

[4139] Issues with C++ exceptions.

- In order to use C++ exceptions, the RPX containing the main program must have exceptions enabled.
  - Thus, if a dynamic library uses C++ exceptions, then the RPX that links to it (directly or through another RPL) must enable exceptions.
- Do not throw exceptions in routines that may be called by Cafe OS.
  - Thus, Cafe OS callbacks cannot throw exceptions.

- Instead, signal an exception in some other manner (for example, set a flag, send a message) to other code that can handle the exception.
- The `try` keyword incurs significant runtime overhead.

🐞 [4283] Do not access I/O request buffers after the corresponding I/O request has been started and before it has completed.

- It is extremely important that no access of the I/O request buffer(s) occur after the request has been started.
- Otherwise, data returned from the request buffer(s) may appear to be corrupted.
- Attempting to "race" or time the arrival of data within the I/O buffer and modify it after it arrives is illegal with Cafe OS. Once an I/O operation starts, Cafe OS is the owner of the destination buffer until the I/O operation completes.
- Cafe OS does not currently have a mechanism to police or enforce this prohibition, so developers must be on their best behavior to prevent access to the request buffer(s).

🐞 [5460] Issues with Cafe OS runtime memory overhead.

- During process execution, Cafe OS imposes additional runtime overhead upon each process. For instance, the user-mode operating system components place per-process data within the address-space of each process. The amount of overhead can be discovered by using the `OSGetMemBound` API as demonstrated in the `replace_core_user` demo.
- Developers should plan for this small overhead.
- It may be necessary to change the `MAX_CODESIZE` value in app.xml to account for the increased code size.
- For more details, please see **Operating System → Cafe Core OS (COS) Overview** and the `OSGetMemBound` API MAN pages.

🐞 Threads affinitized to more than one core that use floating point take a performance hit when rescheduled.

- The overhead comes from synchronizing the FPU state between the processor cores.
- There is no overhead if all threads are affinitized to a single core.

🐞 Issues with `libc malloc` performance.

- `malloc` performance may suffer if you allocate many blocks, due to fragmentation. To alleviate this, we recommend pre-allocating a large, contiguous heap for `malloc` by issuing this call:

```
free(malloc(initial_size)); // where initial_size is the desired malloc heap size
```

SDK 2.12.13 Latest Update

New Features & Changes

[9267] The MAN pages now describe two new functions (and a supporting function) for an application to request disassembly for debugging purposes: `DisassemblePPCOpcode`, `DisassemblePPCRange`, and `OSIsSchedulerLocked`.

- For more details, please see the corresponding MAN pages.

SDK 2.12.04

Bug Fixes

[11387] The data cache `DC*` functions have been correctly tagged as thread-safe.

- For more details, please see the corresponding MAN pages.

[8718] The user-mode status of several special Espresso instructions is now documented.

- For more details, please see **Operating System → Espresso ISA Settings** in the MAN pages.

[2446] Documentation and a demo have been added to describe `gzip`-style compression using `zlib`.

- For more details, please see **Operating System → API Functions → Compression → zlib 1.2.5** in the MAN pages.

[11121] The documentation for the 64-bit atomic functions `OS*Atomic64` has been clarified that these functions should be avoided in favor of the 32-bit atomic functions.

- For more details, please see the corresponding MAN pages.

SDK 2.12.03

Bug Fixes

[CFENET-6957][10697] The 2-step loading `delayed_loading` demo caused the program initialization to be run twice.

- This demo had a main function in its RPL; this function name has been changed.

New Features & Changes

[10651] The `LCHardwareIsAvailable` and `OSGetSecurityLevel` functions have been deprecated. Do not use them in any new code.

- For more details, please see the corresponding MAN pages.

SDK 2.12.00

Bug Fixes

[9002] In certain situations, such as when two threads each try to acquire an RPL at the same time, a `OSDYNLOAD_ERR_LOADER_BUSY` error could occur.

[8403] Pressing the **HOME** Button repeatedly sometimes called a function registered on the `PROCUI_MESSAGE_HBDENIED` message, even if the application did not disable the **HOME** Button.

[10643] Running a demo with the `-v 0` option to `caferun` did not return to `cafe.bat` if the demo automatically exited.

7. Process Lifecycle

SDK 2.12.13 20150302 Update

New Features & Changes

[11704] The documentation has been updated to clarify the usage of the `CAFE_CODE_DIR` environment variable.

- For more details, please see *Create an Application → Preparing Your Application → Application Configuration*.

SDK 2.12.04

Bug Fixes

[6896] The documentation has been updated to clarify the foreground/background status of locked cache.

- For more details, please see *Create an Application → Application Concepts* in the MAN pages.

SDK 2.12.00

New Features & Changes

[CFENET-7669] A new `SYSSwitchToEManual` function has been added to the SYSAPP API.

- This function switches to the e-manual.

8. Graphics and Video

Known Issues

[8837] Calling the `GX2SetPixelSamplerBorderColor`, `GX2SetVertexSamplerBorderColor`, `GX2SetGeometrySamplerBorderColor`, or `GX2SetComputeSamplerBorderColor` functions too frequently will result in a performance loss.

- Beginning with SDK 2.11.01, these functions have an added GPU flush and wait idle to prevent graphics corruption.
- As a result, calling these functions too frequently will result in a performance loss.
- Application developers are advised to only call these functions when necessary.

[3447] Noise may occur in the camera image if you change camera parameters while the camera is running.

- The most noticeable example is changing gamma values. If you change the gamma, noise will occur in horizontal lines.
- Noise may not be as noticeable when changing other parameters. However, if you make a significant change, you may notice noise.
- As a workaround if noisy images are noticeable, you may skip two frames following parameter changes, change parameters only when opening the camera, or make small parameter changes.

[11417] Image corruption occurs at application shutdown if the application calls either of the `GX2Set{TV,DRC}Enable(GX2_FALSE)` functions from Core 0 before it releases foreground.

- As a workaround, do not call `GX2Set{TV,DRC}Enable(GX2_FALSE)` before releasing the foreground.

[11143] The GamePad camera and mic do not work if the real **HOME** Button menu is installed with the Wii U menu changer and application is launched with the `make run` command.

- As a workaround, use the dummy **HOME** Button menu in the SDK or launch the application from the System Config Tool.

🗒 Many of the SDK demos depend on building the textures and shaders first.

- This requirement was added to help reduce the size of the SDK package.
- To build the textures and shaders, please run the following command in a Cafe SDK shell:

  ```
  make -C $CAFE_ROOT/system/src/demo
  ```

9. Sound and Audio

Known Issues

[11020] When debugging a program using a debugger, it is possible for an AX voice to be dropped, especially when debugging audio callbacks.

[10611] In the MIX library, no sound is produced when both the initialized and new user-specified fader value are set to 0db.

- A previous fix has been reverted due to other issues with it. This revert restores the prior behavior.

[10951] Transition audio is played when starting a new process or when rebooting; during this time it is possible for a heartbeat failure to occur.

- The occurrence rate is very low, but the logs will show a message similar to:

  ```
  --- User Heartbeat Timeout Core0 limit:10---
  ```

[8151] The Sound-1 library may produce different output for the PPC and DSP renderers.

- In the Sound-1 library, the PPC renderer can overdrive saturation when a 0dB signal is configured to be boosted by +6dB, resulting in a difference in the outputs between the PPC and DSP renderers.
- This issue is fixed in the new Sound-2 library, but remains in Sound-1.

SDK 2.12.13 Latest Update

Bug Fixes

[11728] The MAN pages for many long-deprecated AXFX functions have been removed.

SDK 2.12.04

Bug Fixes

[11366] The MAN pages have been updated to clarify that `AX_PRIORITY_NODROP` really means the highest voice priority, and that a voice may still be dropped at this priority; it will simply be dropped last.

SDK 2.12.02

Bug Fixes

[11115] The Sound Pipeline `SP*` functions were incorrectly designated as host-only. They are for the Wii U console.

SDK 2.12.01

Bug Fixes

[10933] In both Sound-1 and Sound-2, transition audio could cause a hang if the given audio file length was not an exact multiple of the audio frame size (144 samples).

10. Near Field Communication

SDK 2.12.12

New Features & Changes

[CFENET-8594] The NFP library has been added to the public SDK release package.

- For more details, please see the nn library release notes:

  `$CAFE_ROOT/system/docs/man/en_us/nn/public/API/html/release_notes.html`

11. File System

SDK 2.12.04

Bug Fixes

[CFENET-8139] If the debug level was set to **LV 2: Information** or higher, the file system produced an excessive amount of logging output.

- The logging messages have been reassigned to more appropriate logging levels.

12. Game Save

SDK 2.12.11

Bug Fixes

[CFENET-8438] Calling the `SaveInitSaveDir` function resulted in an error when both the SAVE and BOSS sizes were set to 0.

- `SaveInitSaveDir` now returns `SAVE_STATUS_OK` in this case as it did with SDK 2.12.04 or earlier.

13. Game PADs (DRC, Wii Remotes, etc.)

Known Issues

DRC

[8345] In the `drc/cameramic` demo, a buffer underflow error may appear after repeatedly closing and re-opening the camera.

- The DRC mic driver is correct; the demo's handling of camera restart and foreground/background switching is the issue.

Audio noise may occur on the DRC in a bad wireless environment.

- Depending on the wireless environment, the DRC audio stream could be interrupted for a few milliseconds.
- This noise results from the DRC system design and is unavoidable.
- If there are no such interruptions when you play the same audio source on the TV, this is most likely the issue.

[10600] You are unable to update the firmware of a second GamePad when **Wii U GamePad (DRC) Setting → Multi DRC** is set to **ON** in System Config Tool.

- As a workaround, you may temporarily install the second GamePad as the first GamePad, update its firmware, and then re-install it as the second GamePad.

The DRC Touch Screen may return a coordinate different from the touched location.

- Rarely, the DRC Touch Screen may return a coordinate different from the location that was actually touched.
- This issue's frequency varies by how you touch the screen:
  - When making firm contact using the special stylus, it happens once every several thousand times.
  - It happens more often when touching lightly or when touching with a finger.
- Normally, if the value from Touch Screen is uncertain (cannot be guaranteed), the `validity` field of `VPADTPData` will be one of the `VPAD_TP_VALIDITY_INVALID_*` values. However, in this case, even though `validity` = `VPAD_TP_VALIDITY_VALID`, an uncertain value is still returned.
- When input errors are not acceptable, such as when offering an important choice, use two or more frames-worth of coordinate data instead of one to determine the input.

`VPADRead` may not return an error even if the DRC becomes disconnected during a system transition.

- If the DRC becomes disconnected during a system transition, due to a lost battery or wireless connection, a disconnection event may not be sent even though DRC is not connected.

- For example, if the DRC disconnects while moving from the HOME button menu to the application, `VPADRead` may not return `VPAD_READ_ERR_NO_CONTROLLER` and keep returning `VPAD_READ_ERR_NO_DATA`.
- If this error continues for 10 seconds or longer, you can assume that the DRC has been disconnected.
- If the DRC becomes reconnected during this condition normal behavior will resume.

SDK 2.12.04

New Features & Changes

WPAD

[11172] The WPAD library now displays the packet rate for Bluetooth channels when the wireless environment is very poor.

- This message should help clarify when wireless conditions are impacting Wii U controller performance.

SDK 2.12.01

New Features & Changes

KPAD

[10594] A new WBC verification demo has been added.

- For more details, please see `$CAFE_ROOT/system/src/demo/kpad/wbc_kpad_verification.cpp`.

Bug Fixes

KPAD

[11063] The `KPADRead` and `KPADReadEx` functions could return some invalid controller data immediately after process a process switch.

[10086] The MAN page for the `kpadmpls` demo has been updated updated to describe the calibration steps more completely.

- For more details, please see *Controllers → KPAD → Demos → MotionPlus* in the MAN pages.

SDK 2.12.00

Bug Fixes

Wii U Bluetooth Devices

[8783] When disabling Bluetooth devices with the `WPADEnableWiiRemote` and `WPADDisableBluetooth` functions, the devices were not disconnected sometimes.

- Also, the devices could not be disconnected thereafter.

14. Network

Known Issues

[6048] Initial association fails for certain older routers when they are configured as WPA2 PSK AES.

- D-Link DI-524 vC1, DI-624 vC3.

WPS fails with certain older routers.

- [4835] ZyXEL NBG318S, NBG334W, X550N.
- [6047] Linksys WRT350N

SDK 2.12.04

New Features & Changes

[11316] During development, you can now configure your own `hosts` file.

For more details, please see *Network → Debug → Hosts File* in the MAN pages.

SDK 2.12.02

New Features & Changes

[10997][8741] The `NSSLExportInternalClientCertificate` and `NSSLExportInternalServerCertificate` functions now cause an assertion failure for a misaligned buffer.

- Just a warning is printed in an NDEBUG build.

[10999] A new `SOGetAddrInfoRSU` function has been added that uses less of stack space than `SOGetAddrInfo`.

- For more details, please see the corresponding MAN page.

[10117] A new `SOMemOpt` function allows the program to allocated dedicated socket buffers for itself.

- For more details, please see the corresponding MAN page.

SDK 2.12.00

New Features & Changes

[10961] Support for CRLs (Certificate Revocation Lists) has been added to the NSSL library.

- For more details, please see **Network → HTTP Client (libcurl) → HTTPS**, the page for the `NSSLADDCRLExternal` function, and related in the MAN pages.

Bug Fixes

[10866] The `curl_multi_add_handle` and `curl_multi_remove_handle` functions now properly check for NULL pointers to prevent a crash.

15.   System Configuration

SDK 2.12.11

Bug Fixes

[CFENET-8432] The `SCIGetParentalAccountNetCommunicationOnGame` MAN page now mentions that local communication should not be restricted even when `net_communication_on_game` is restricted under Parental Controls.

SDK 2.12.00

New Features & Changes

[CFENET-6513] When an unknown language is set in the system configuration, the `SCIGetCafeLanguage` function now returns the default language for each platform region.

- In the past, `SCIGetCafeLanguage` returned `SCI_PLATFORM_REGION_INVALID` in this case.
- The default language for each region is as follows:

Region	Default Language
Japan	Japanese
North America	English
Europe	English
China	Simplified Chinese
Korea	Korean
Taiwan	Traditional Chinese
Other	English

16.   AOC/Patch

SDK 2.12.04

Bug Fixes

[CFENET-8323] An application's `meta.xml` file was not updated when another version of `meta.xml` for the same title was cached.

- This could occur in the following scenario:
  1. Run an application before applying a patch.
  2. Go back to the menu to install the patch.

3. Launch the application after applying the patch.
4. Open **HOME** Button menu to run an overlay application.
5. Go back to the application, and do something that looks at the `meta.xml` (saving, or observing AOC).

17.　Mastering

Known Issues

Do not use the preloading feature with disc titles.

- If the preloaded title disc contains the CafeSDK 2.08-series update partition, you will encounter the following problem:
  - Once a disc is inserted, it should normally take about 10 to 20 seconds to display the icon on the Wii U menu. However, it will take 40 seconds instead, and you will hear the disc drive seeking.
- For more details, please see *Cafe SDK Basics → Development Cycle → Master Applications → Preloading Applications* in the MAN pages.

SDK 2.12.13 Latest Update

Bug Fixes

[11569] The mastering tools no longer re-extract a wumad if it had been extracted already and was unchanged.

SDK 2.12.12

New Features & Changes

[CFEMTD-822] A new tool called `addcfinstallablepartition` has been added to create a disc with a patch.