

**Subject:** Unified POSIX and Windows Credentials for Solaris  
**Submitted by:** Mike Shapiro  
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**Product Approval Committee:**

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### 1. Summary

This project is an overview of and proposal for accommodating non-POSIX identities in Solaris with minimum disruption to all existing interfaces. It provides a baseline upon which to evaluate other projects including those in [1] section 19.

### 2. Decision & Precedence Information

This project is approved as specified in references [1], [2] and [3], but as modified by the required technical changes listed in Appendix A below.

By itself, this project defines no concrete deliverables. Subprojects in [1] section 19, are expected to modify types *uid\_t* and *gid\_t* to allow for use of values in the range `[0x80000000:0xffffffffe]`. Such modification may be delivered in a minor release of Solaris.

### 3. Interfaces

The project exports the following interfaces.

Interfaces Exported		
Interface	Classification	Comments
<i>uid_t</i>	Committed	type change to unsigned
<i>gid_t</i>	Committed	type change to unsigned

### 4. Opinion

The majority of the discussion involved the impact on the Solaris Community with respect to “negative” User and Group identifiers. The materials [1] and [3] provide an analysis of the impact. That analysis lead the committee to accept that it is unlikely that existing Sun and third party executables will experience a change in behavior.

#### 4.1. Standards

The project team has documented in [1] section 10 how the relevant programming interface (API) standards provide vendor latitude in values used for user and group identifier types *uid\_t* and *gid\_t*. The API standards require these be integral types. Analysis the project team provided shows existing programs written to conform to the:

POSIX,  
Single UNIX<sup>†</sup> Specification,

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<sup>†</sup> UNIX is a registered trademark of The Open Group in the U.S. and other countries.

System V Interface Definition, Third Edition and  
X/Open Portability Guide

standards are expected to continue to run correctly.

However, relevant Application Binary Interface (ABI) standards such as the System V ABI for Intel386™ and SPARC™ as well as the SPARC Compliance Definition, require that *uid\_t* and *gid\_t* types be signed long. Binary compatibility is preserved for existing application binaries. The project team cannot know the complete set of Solaris applications that may be affected by recompilation. Incompatibilities may occur either due to the type change or assumptions about the nature of *uid\_t* or *gid\_t* values. The business plan required by the project that integrates the type change is intended to mitigate third party applications. See 6. Advisory Information below.

#### 4.2. Ephemeral User and Group IDs

This project proposes two ranges for user and group IDs. The legacy POSIX range is defined in Solaris as the “positive” 32 bit integers [0x0:0x7fffffff] and -1, and an ephemeral range is defined as the “negative” 32 bit integers [0x80000000:0xffffffffe]. The ephemeral range is intended to be used to map Microsoft Security Identifiers (SIDs) [4] to 32 bit integers for use in Solaris *uid\_t* and *gid\_t* fields. Mappings are intended to be performed by the Winchester: Schema Mapping and ID Mapping for AD Interoperability (PSARC/2006/315) project.

#### 4.3. Updated 20 Questions

To assist project teams and the ARC in understanding and accessing the impact of changing user and group ID types, this project will update the PSARC 20 questions.

#### 4.4. Sentinel User and Group IDs

Standard interfaces `setreuid(2)` and `setregid(2)` specify -1 as a sentinel value. The value -1 is not included in the set of ephemeral identifiers. Additionally, some Solaris components have internally used other sentinel user and/or group identifiers. Until the impact on these components is verified, any implementation of ephemeral identifiers will reserve -2 and -3 ephemeral values. In particular, the NFS subsystem defines `NFS_UID_NOBODY` and `NFS_GID_NOBODY` as -2 in versions 2 and 3; the Solaris Audit subsystem uses `(uid_t)-1`, `(uid_t)-2` and `(uid_t)-3` as sentinel values.

#### 5. Minority Opinion(s)

None.

#### 6. Advisory Information

##### 6.1. Advice for Subprojects

During the discussion a number points of advice for the proposed subprojects were identified:

- The CIFS Service (PSARC/2006/715) project will need to modify PAX.
- The project that integrates the type change to *uid\_t* and *gid\_t* will need to provide developer documentation for how to deal with the type change. Furthermore, a business plan for how to handle ISVs who may have problems with their code must be presented.
- The project that integrates the type change must audit the use of *uid\_t* and *gid\_t* over as broad code base as possible to ensure that ephemeral IDs do not cause change in existing binary behavior.

##### 6.2. Risks to Existing Code

The Product Approval Committee is advised that acceptance of this project and its subprojects may pose unforeseen binary incompatibilities. Appropriate business plans need to be in place to mitigate any incompatibility.

### 6.3. ABI Standards

The Product Approval Committee is advised that acceptance of this project and its subprojects places Solaris in violation of ABI standards. See 4.1. Standards above. Revision of the relevant standards may be desirable. 7.1. Technical Changes Required below and the business plan above are intended as mitigation.

## 7. Appendices

### 7.1. Appendix A: Technical Changes Required

1. Type changes for *uid\_t* and *gid\_t* may not be integrated unless all of the official generic and processor specific SPARC ABI conformance tests for the System V ABI pass. Equivalent tests are not defined for x86 and x64 systems[5]. The list of tests is:
  - SCD version 2.4.1.
  - gABI version 2.1.
  - psABI version 2.1.

If the tests all pass successfully or all pass after any newly discovered bugs are fixed, then the type changes are accepted and may be integrated. If an unresolvable test issue is discovered, the project team must return to ARC to discuss an appropriate resolution, including discussing the relative merits of leaving the types alone (i.e., “negative” values for ephemeral IDs) versus documenting a difference with respect to the ABI document (and thus conforming to the language of POSIX with respect to non-negative values).

### 7.2. Appendix B: Technical Changes Advised

None.

### 7.3. Appendix C: Reference Material

Unless stated otherwise, path names are relative to the case directory PSARC/2007/064.

1. Project Specification  
File: commit.materials/spec.txt
2. Update to PSARC 20 Questions  
File: commit.materials/20questions.new
3. Answers to issues  
File: issues
4. Microsoft Security Identifiers  
<http://technet2.microsoft.com/WindowsServer/en/library/86cf2457-4f17-43f8-a2ab-7f4e2e5659091033.mspx?mfr=true>
5. Discussion of ABI conformance tests  
File: x86x64-ABI  
File: mail