New UUID Formats

draft-peabody-dispatch-new-uuid-format-04

Dispatch IETF 114
Problem Statement

- RFC4122’s only time-based UUID suffers from poor database index locality
- Uncommon timestamp epoch choice
- Need to update UUID for modern security practices: CSPRNG, No MAC, etc
- Many implementations details of RFC4122 need updating
- Better clarification on UUID generation and UUID storage
- Better clarifications around big endian and little endian
UUID Version 6

- Time-based UUID based on same inputs as UUIDv1
- No modification of the Gregorian Epoch from UUIDv1
- Otherwise no other changes except suggesting pseudo-random values over MAC addresses

Appendix B.1 - Example of a UUIDv6 Value

```
1EC9414C-232A-6B00-B3C8-9E6BDECE D846
```
UUID Version 7

- Time-Based UUID
- Unix Epoch with Millisecond Timestamp Resolution
- Remaining layout is entropy

Appendix B.2 - Example of a UUIDv7 Value

```
017F22E2-79B0-7CC3-98C4-DC0C0C07398F
```
UUID Version 8

- Entire layout (122 bits) may be used for anything
- Usage: Experimental, Vendor-specific, Delta modifications to UUID v1 - v7

Appendix B.3 - Example of a UUIDv8 Value

Custom

320C3D4D-CC00-875B-8EC9-32D5F69181C0

Version  

Variant
Max UUID

- All 128 bits set to 1
- Inverse of Nil UUID from RFC 4122

Example Max UUID Value

All 1’s

FFFFFFFF-FFFF-FFFF-FFFF-FFFFFFFFFFFFFFFF
Implementor Best Practices

- Timestamp Granularity, Reliability, Source, Precision, Accuracy, Length, Fuzzing, altering, smearing, Padding, or Truncating
- Monotonicity, Counters: length, placement, generation, seeding, incrementing, rollover guarding, and rollover error handling
- Distributed UUID Generation
- Collision Resistance mechanisms
- Global and Local Uniqueness
- Un-guessability through CSPRNG
- Sorting considerations
- Opacity and introspection
- General Database Considerations
- Security Considerations
## Draft 03 and 04 Implementations

<table>
<thead>
<tr>
<th>Name</th>
<th>Language</th>
<th>UUIDv6</th>
<th>UUIDv7</th>
<th>UUIDv8</th>
<th>RFC/Draft</th>
</tr>
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<tbody>
<tr>
<td>oittaa/uuid6-python</td>
<td>Python</td>
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<td>Yes</td>
<td>No</td>
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<tr>
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<td>mareek/UUIDNext</td>
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<td>Yes</td>
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