Does DPDK need a stable ABI?

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Adapting to change?

Development Processes
- Waterfall → Agile → DevOps

Application Architecture
- Monolithic → Multi-tiered → Micro-Services

Deployments
- Appliances → Virtual Machines → Containers

Data-Plane Development Kit
- Proof of Concept → Open Source Project → Product
What is an ABI?

**Application**

- function calls

**ABI**

- Instruction set
- Executable & Linker Format
- Calling Conventions

**API**

- Programming Language
- Functions
- Datatypes
- Constants
- ...

**DPDK**
Why ABI Stability?

Maintaining a stable ABI for this change is impossible!

There is too much DPDK ABI churn, keeping up to date is impossible!

These network apps are just broken and it is impossible to update them!

Contributors

Application Developers

NetOps Engineers

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We care about user-space interfaces to an insane degree. We go to extreme lengths to maintain even badly designed or unintentional interfaces. Breaking user programs simply isn't acceptable.

Linus Torvalds, 2005
Comparative ABI Churn

GStreamer Application Binary Interface
- 100% backward compatible within Major Versions (1.x).
- Stable since 1.4.5, typically < 1% change between Major Versions.


DPDK Application Binary Interface
- 8.7% median ABI churn between quarterly releases.
- LTS release is API stable for 2 years, however limited backporting of new features or HW.


Thanks to ABI Laboratory for providing the ABI analysis tools.
Proposals on ABI Stability

Major ABI versions are declared every year and are then supported for one year, typically aligned with the LTS release.

The ABI version is managed at a project level in DPDK, with the ABI version reflected in all library’s soname.

The ABI should be preserved and not changed lightly. ABI changes must follow the outlined deprecation process.

The addition of symbols is generally not problematic. The modification of symbols is managed with ABI Versioning.

The removal of symbols is considered an ABI breakage, once approved these will form part of the next ABI version.

Libraries or APIs marked as Experimental are not considered part of an ABI version and may change without constraint.

Updates to the minimum hardware requirements, which drop support for hardware which was previously supported, should be treated as an ABI change.

[dpdk-dev] [PATCH v3 0/4] doc: changes to abi policy introducing major abi versions
Major ABI versions are declared every year aligned with the LTS release.

ABI / API remains stable for one year, from the LTS.
The addition of symbols is generally not problematic. The modification of symbols should be managed with ABI versioning. New platform, features & improvements continue to be released.
<table>
<thead>
<tr>
<th>In Scope</th>
<th>Out of Scope</th>
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<tbody>
<tr>
<td>• lib</td>
<td>• lib (experimental)</td>
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<tr>
<td>• drivers (with public API's)</td>
<td>• api (annotated experimental)</td>
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<td>Our choices ...</td>
<td>Best Case</td>
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<tr>
<td>What if we <strong>do not</strong> make this change?</td>
<td>Application developers are slow to adopt new versions.</td>
</tr>
<tr>
<td>What if we <strong>do</strong> make this change?</td>
<td>Contributors adding new features, need to take care of ABI compatibility</td>
</tr>
</tbody>
</table>

Integrating new DPDK versions is sooooooo painful ....

Gonna take some extra time, need to ensure ABI compatibility....

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Next Steps

• Tentative agreement at the DPDK Technical Board.

• Supporting work - preparation for ABI stability
  • Review of exposed data structures and inline functions.
  • Supporting infrastructure to test ABI stability in the UNH lab.
  • Ensure testing of ABI Compatibility as part of the RC Test Cycle.
  • Removal of old ABI Versioning code.

Pending today’s feedback, now is the opportunity to voice how this change affects you!
Questions?

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