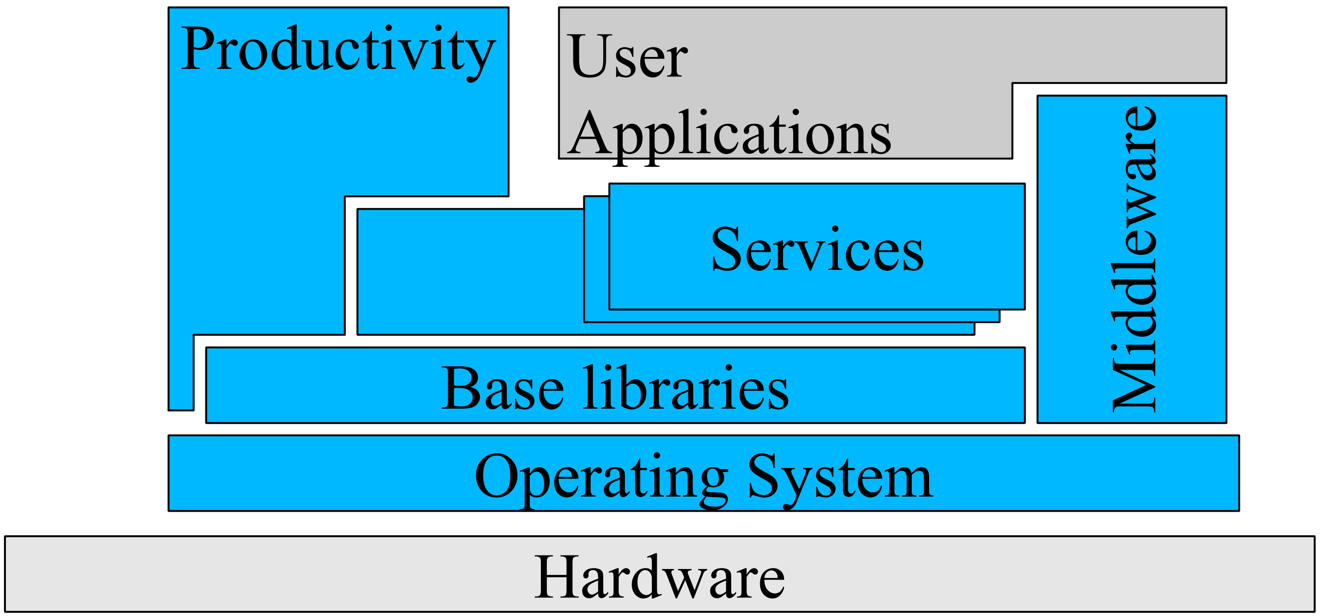
Commercial and Free & OpenSource Software

- “IP” overview
- Criteria
- Examples from CERN
- Forecast

Scope

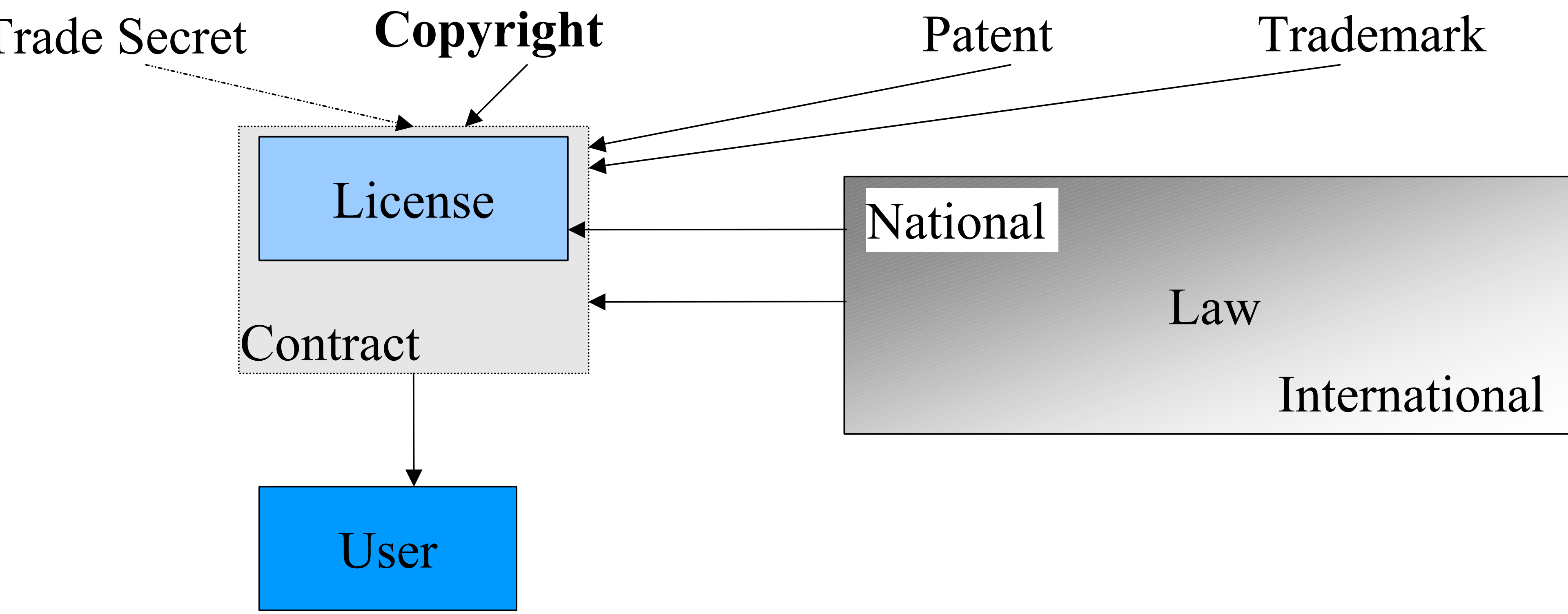
- Physics computing
- Service "building blocks"
- Not: Physics Application software == written by the users



#include <std_disclaimer.h> /* IANAL */

Bias: Linux support

"Intellectual Property"



- Idea: temporary **monopoly** to encourage innovation
- **Copyright**: automatic, "all rights reserved"
- **Patent**: "optimistic" grants

Software Licenses: Key areas

(Definitions)

Execution: run the software

Modification: changes, bugfixes, rights to the changes

Re-Distribution (yes / no)

Warranty (rather: exclusion of ...)

Restrictions (examples):

- keep original license or credits, identify changes
- No reverse engineering
- No use for certain applications (nuclear, medical, military...)
- Patents & Trademarks usage
- No reporting of performance results
- Need to consent to remote checks / automatic updates
- ....

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GPL version 2

Software Licenses

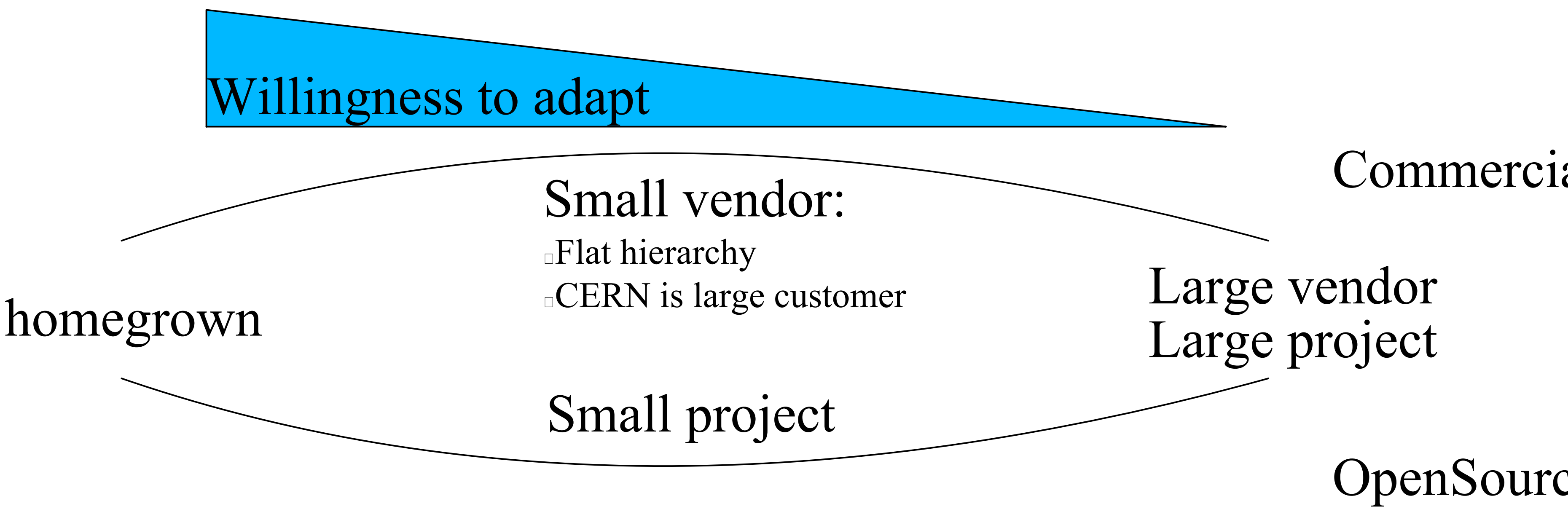
- Ownership: author has all rights anyway
- Public Domain: author grants all/most rights to public
- **F**ree: GNU Public License and compatible
  - Grants rights to use, modify and redistribute, but only under same license. Requires to redistribute source code. http://gnu.org. Emphasis on Freedom and social contract
- free:
  - BSD: right to use,modify and redistribute. May need to contain "prominent notices".
  - OpenSource licenses: http://opensource.org/docs/definition.php
- Everything else: single-user, binary only, "do not distribute" EULA.
  - Not always enforceable in local jurisdiction (click-through, shrinkwrap, restrictions on reverse engineering...)

Criteria for "software service"

- Ideal: Provide zero-cost service with all required features forever and without interruption.
  - Criteria (== cost. In the end.)
    - Suitability
    - Stability
    - Lifetime management
  - Costs
    - Short-term (Migration) / long-term (support, service, lock-in)
    - Manpower / money
    - Direct (to service provider) / Indirect (to users)
    - Immediate / Potential (risks)

Customization issues

- Off-the-shelf does not fit (most of the time).
  - Somebody will need to adapt it: Author / Vendor or CERN
  - Or CERN will have to change procedures



Implications on support:

- Large vendors try to raise the hurdle (whitelist of supported configs)
- Projects tend to ignore you unless you are "sexy" or hit widely-interesting problems

Stability & Lifetime issues

- Stability
  - Instability == wasted resources (human & technical) == cost.
  - Vendor warranty can offset (real) costs, but is rarely offered and too expensive
  - Instability == direct damage to reputation
  - Vendor reputation can decrease risk, both service-related and personnel ("...nobody ever go fired for buying XXX")

- Lifetime management
  - Software is constantly evolving (new features, old bugs)
  - Software market is changing
  - Upgrades (same software) and migrations (new software) will happen
    - Lock-In can be expensive (persistent data, proprietary APIs, support conditions)
    - Collateral requirements can disrupt service change management (upgrade cycles)


Examples: CASTOR (CERN Advanced STORage mananger, http://cern.ch/castor)

- CERN homebuild, in-house development and service, few external users
- License: CERN proprietary, being clarified at the moment (commercial opportunities vs. community involvement)
- Unique storage needs of CERN. IBM HPSS was evaluated 98/99 but
    - Customization was expensive and continuous effort (vendor not taking up mods)
    - No perceived advantages in terms of support cost
    - Not suitable for random access patterns (Disk pool via UNIX file system)
    - Heavy requirements (DCE on all clients)
- CASTOR prototype performed well during ALICE mock DC 2001 → decision to adop in 2002
- Alternatives:
    - dCACHE + HPSS, IBM StorageTank ?
    - Any candidate would need in-depth evaluation (years)
    - No strong contender in sight
- Migration will be difficult (2 PB of data)
    - Current development effort is to modularize and move to standard (internal) interfaces

LSF: Load Sharing Facility, http://platform.com/products/LSF

- platform.com: small company (140 employees), dynamic, academic env.
- CERN is major customer (largest installation in #CPUs)
- Excellent relationship (requirements discussion, developer on site, direct access to developers)
- Responsive to feature requests
  - AFS, Kerberos4 integration (now add-on products)
  - access to source (NDA)
  - CERN requests/ideas taken into mainline products (1 year delay)
- low CERN cost (1FTE) for integration and support
- License cost « DIY cost (features & support)
- Replaced (opensource) NQS at CERN in 1997
- Competing against opensource/freely available MAUI, PBS, SUN GridEngine...
  - Today: LSF is more flexible and sophisticated, CERN uses (some) advanced features
  - Platform is fast-moving (free GLOBUS integration with per-pay support)

Example: ORACLE http://oracle.com

- Large company (40.000 employees), CERN is small but priviledged customer
  - Access to developers
  - Beta tests
  - Proposed modifications
- Strict on requirements (certified = supported on Red Hat & SuSE “Enterprise”)
- Already used at CERN (HR, administrative):

  → Synergies
  - Proven record for stability and support
  - 'Good deal':
    - HEP-wide license
    - CERN actively uses ORACLE support for operational problems, cheaper than DIY
- Any migration would be expensive
- Future:
  - Commercial contenders (SQLserver, DB2) offer no strategic advantages
  - FOSS: MySQL, PostgreSQL lack advanced features (code instrumentation), scalability and support structure, would need “confidence building” period

Example: Linux kernel http://kernel.org

- Large OpenSource project, CERN is 'small' user
- Multiple levels of involvement:
  - (CERN users): custom hardware
  - CERN-IT: overall support, customization
  - Distributors (Red Hat, SuSE)
  - Developers
  - "tree dictator" (Linus Torvalds for 2.6)
- CERN needs to maintain own customizations
  - occasionally feeding back to community
- Future:
  - Commercial (Solaris x86, MS Windows, LynxOS, ...):
    - Restrict co-development and deployment (licensing)
    - Off-the-shelf does not fit, slow turnaround, no advantages if modified
    - Not driven by user community: Linux was introduced at CERN via “grass-root” mvmt
  - FOSS alternatives (xxBSD, GNU Hurd): less momentum, less users, narrow hardware

Example: CERN Linux distribution http://cern.ch/linux

- CERN has customized distribution (software packages and procedures), used by smalle HEP institutes
- Based on Red Hat 7.3 (http://redhat.com/), using freely available software and update services
- In 2003, Red Hat splits into
  - Instable "home use" Desktop release (now Fedora Project) - for free.
  - Stable "production" version ("Red Hat Enterprise") with commercial support and certified 3rd party software.
- CERN now has do decide what to use next
  - stay with Red Hat or change (Debian, SuSE = Novell)
  - Spend manpower and do "self-support", perhaps community-wide (HEP / universities), or
  - Spend money, buy licenses.
- Currently negotiating, together with other HEP institues (SLAC, Fermi, ...)

Forecasts

- Projects tend to go OpenSource, not vice versa:
  - Netscape → Mozilla, Transarc/IBM AFS → OpenAFS, StarOffice → OpenOffice, SAP-DE Kylix,..
  - Typically for strategic reasons (get out of maintenance, annoy competitors)
  - Typically for products on the decline (market share, technology evolution)
- New OpenSource projects either address niche markets or copycat commercial product
- OpenSource tends to catch up and commoditize

  → OpenSource eats existing market share
- OpenSource most fundamental advantage: choice between

  MONEY and MANPOWER
- To compete, commercial products either
  - Need to evolve constantly ("run away")
  - Need to offer substantial support and / or warranties to offset license cost
  - Need to be cheaper than DIY, over time

Resources

- F.Fluckiger: DMM presentation on CERN software licensing
- Windows XP EULA: %systemroot%\system32\eula.txt
- GNU General Public License
- OpenSource definition and list of licenses: http://www.opensource.org/