

Software deployment and maintenance

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What is deployment?

Getting software out of the hands of the developers into the hands of the users.

Some stats:

- ▶ More than 50% of commissioned software is not used, mostly because it fails at deployment stage.
- ▶ 80% of the cost of (commissioned) software comes at and after deployment.

What are the issues that make it hard?

Is deployment the problem?

Not always.

Often, problems *show up* at deployment which are actually failures of requirements analysis.

Such problems can be very hard or impossible to fix, in a large system. e.g. NPfIT...

However, there are also genuine transition issues.

Key issues around deployment

- ▶ **Business processes.** Most large software systems require the customer to change the way they work. Has this been properly thought through?
- ▶ **Training.** No point in deploying software if the customers can't use it.
- ▶ **Deployment itself.** How physically to get the software installed.
- ▶ **Equipment.** Is the customer's hardware up to the job?
- ▶ **Expertise.** Does the customer have the IT expertise to install the software?
- ▶ **Integration** with *other* systems of the customer.

Deployment itself

Many people will sell you tools to help deploy software. Such systems help you to:

- ▶ package the software
- ▶ make it available (nowadays over Internet or on DVD)
- ▶ give the customer turn-key installers, which will:
- ▶ check the system for missing **dependencies** or drivers etc.
- ▶ install the software on the system
- ▶ set up any necessary licence managers
- ▶ ...

Maintenance

The process of changing a system after it has been delivered.

Kinds

- ▶ **Fixing bugs and vulnerabilities:**
not only in code, but also design and requirements
- ▶ **Adapting to new platforms and software environments:**
e.g. new hardware, new OSes, new support software
- ▶ **Supporting new features and requirements:**
necessary as operating environments change and in response to competitive pressures

Maintenance challenges

- ▶ Often a new team has to understand the software
- ▶ Development and maintenance often separate contracts:
De-incentivises developers paying attention to maintainability.
- ▶ Maintenance work is unpopular: seen as less skilled, can involve obsolete languages
- ▶ As programs age, structure degrades and are harder to change:
Not only software itself, also compilers, documentation.

Software evolution and release management

Discipline in the evolution of software is (at least) as important as in its development.

- ▶ gather change requirements: new features, adapting to system/business change, bug reports
- ▶ evaluate each; produce proposed list of changes
- ▶ go through normal development cycle to implement changes – *ensuring that you understand the software*, which may be non-trivial.
- ▶ issue new release

Unfortunately, emergencies happen, and things have to be done with urgency. If at all possible, go through the normal process afterwards.

Re-engineering

Re-engineering is the process of taking an old or unmaintainable system and transforming it until it's maintainable. This *may* be considerably less risky and much cheaper than re-implementing from scratch.

Re-engineering may involve:

- ▶ **Source code translation** e.g. from obsolete language, or assembly, to modern language.
- ▶ **Reverse engineering** i.e. analysing the program, possibly in the absence of source code.
- ▶ **Structure improvement**, especially *modularization*, *architectural refactoring*
- ▶ **Data re-engineering**, reformatting and cleaning up data.
- ▶ **Adding adaptor interfaces** to users and newer other software

Issues:

- ▶ What is the specification?
- ▶ Which bugs do you deliberately preserve?

Reading

Suggested: Sommerville on software evolution and maintenance