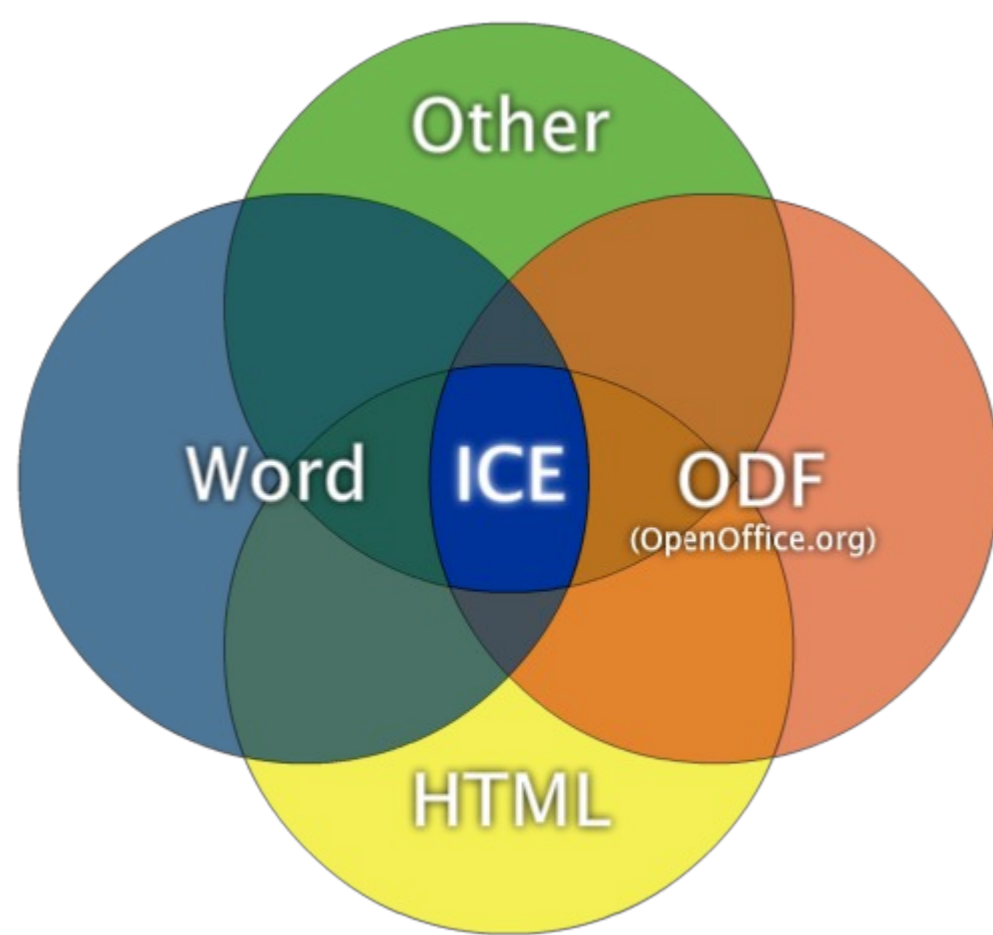


# The Integrated Content Environment for Research and Scholarship Single source flexible publishing for the academy

The Integrated Content Environment (ICE) is a word processor based system that allows authors to work individually or collaboratively on material for the Web, CD and print. Developed at the University of Southern Queensland as an open source project it uses standards to create sustainable methods of authoring using different word processors across multiple platforms.

The ICE for Research and Scholarship project (ICE-RS) received funding from the Australian Commonwealth *Department of Education, Science and Training* (DEST) in 2006 to extend features in ICE in order to improve the process of conducting and reporting on research.

## Stay neutral in the document format wars



Even though the web is in its late teens, most authors are using word processors such as Microsoft Word, which can not produce standards-compliant web content. ICE fixes this problem – making it easy for people to write content for print and the web with a familiar interface. ICE uses a set of word processor styles which can be extended for specific purposes and works by finding common ground between popular word processors and HTML. It also provides authors with instant feedback, creating HTML and print views of content as they work, helping to create standards compliant preservation-ready documents.

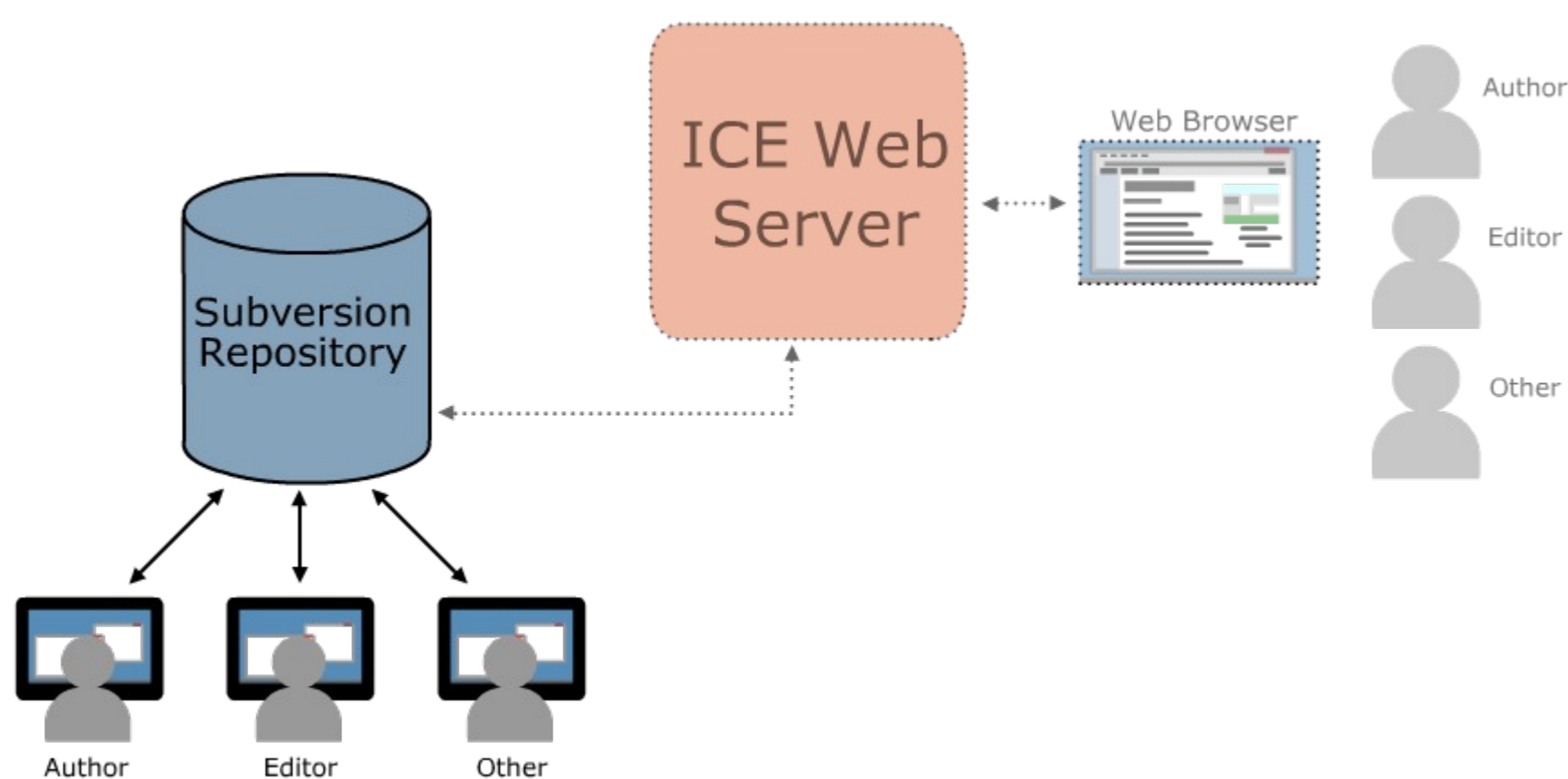
## Helps to reduce production costs

ICE helps reduce costs by producing:

- Multiple outputs from a single source.
- Redistributing only changed files - saving time and network traffic.
- Minimizing the handling of content.
- Keeping the corporate look of material separate from the content.

ICE is already delivering benefits in the USQ context by reducing document production costs and providing authors with proven templates and methodologies. Individual authors are more productive, and wasteful manual conversion steps are being eliminated or minimized.

## Authoring Processes



ICE enables existing products to be more interoperable as it is a cross platform application, including Microsoft Windows, Apple Mac OS X and Linux / Unix. ICE integrates a number of existing systems including a web browser as the interface for managing and previewing the output. A word processor is used for authoring (currently OpenOffice.org and Microsoft Word) and full versioning control through the use of the open source system Subversion.

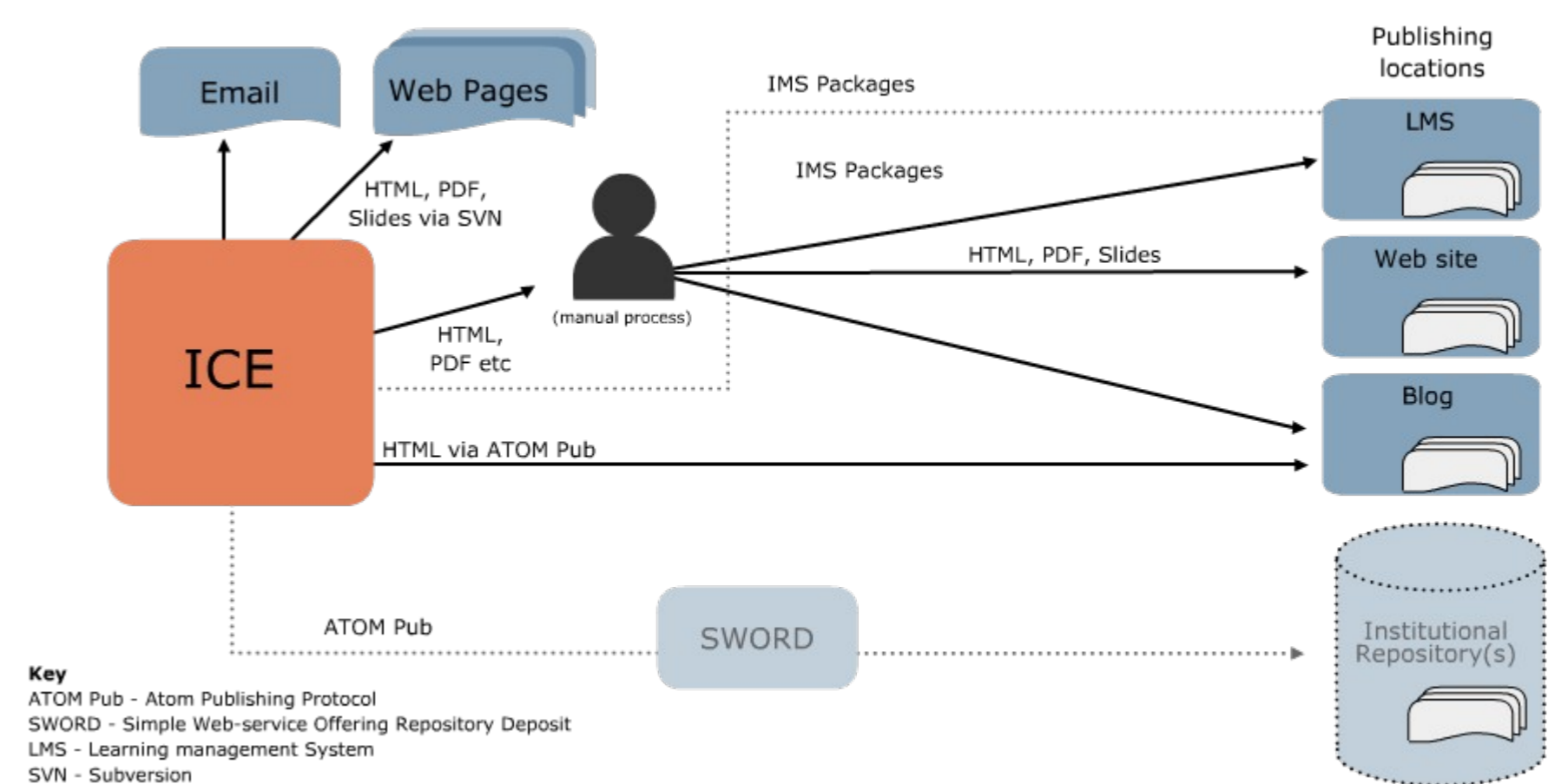
## Utilizes open standards for data, content, and services

ICE is built using standards:

- The OpenDocument standard developed by OASIS, as used in the OpenOffice.org odt format. Word processor documents are first converted to odt before being rendered into XHTML and PDF.
- IMS packages, used as a basis for generating navigation and for publishing to Learning Management Systems (LMSs).
- XHTML as specified by the W3C.
- Atom Publishing Protocol for publishing and Atom feeds update notifications.
- A nascent standard set of word processor style names.

The use of an interoperable set of word processing styles is key to converting documents between formats, also creating files that are more sustainable. There is potential to make the set of style names used by ICE a standard through an appropriate standardization process.

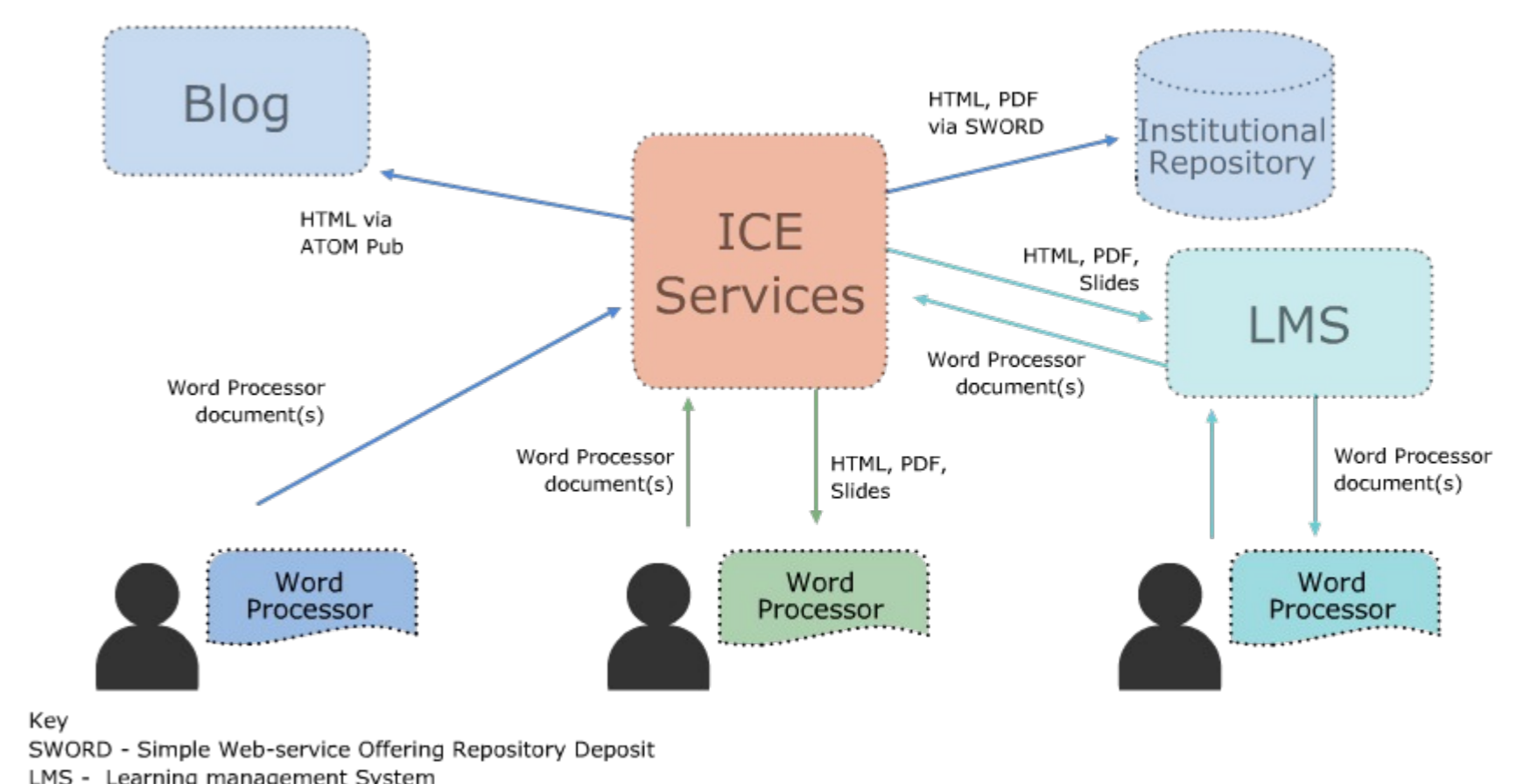
## Publishing Processes



While ICE has so far been used by courseware authors (more than a hundred at USQ and counting) the ICE-RS project seeks to improve national research effectiveness by providing infrastructure in the form of software tools, documentation and pre-packaged training materials for academic authors. It also seeks to improve efficiency, provide greater usability of research outputs, and simplify publication to research repositories for sustainability.

The ICE-RS project will also include functionality to publish into institutional repositories using standard protocols such as the ATOM Publishing Protocol and the **SWORD** (Simple Web-service Offering Repository Deposit). This allows ICE to publish documents into multiple and varying types of repositories for sustainability.

## Future work – ICE as a conversion service



ICE has so far been deployed as a client-side application, which runs as a web server on authors' computers. This is ideal for heavy users who work with long, complex content but in the latter part of 2007 we are focusing on breaking ICE into services and creating a pure web version.

### For applications such as an LMS or CMS

ICE will offer conversion services so authors can submit styled word processor files to an LMS or CMS that are then converted to HTML and PDF.

### For end-users

ICE will be available via simple web services, with easy-to use add-in interfaces for the author's word processor.