Which school software should be, or should not be, in the Cloud?

There is a natural inclination for everyone to assume that software should be 'in the Cloud'.
But it depends!
It depends on the purpose and use of the software.

In particular the reasons for an MIS and for timetabling software are very different.
This 'white paper' discusses the differences.

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What is Cloud computing ?

Simple file storage 'in the Cloud' is easy to understand and to use. It simply means that you can store some data-files 'in the Cloud' by uploading them, via your internet connection to a remote server. This server may be in the same country or anywhere in the world. To upload them requires an application such as Drop-box or Google Drive or Microsoft OneDrive or Sync, etc.

You can then access and download those files from any other device (laptop, tablet, phone) from any location ...provided you have a decent internet connection.
For example, within **TimeTabler** we provide an easy link to Dropbox etc so that you can store your timetable data 'in the Cloud' (eg. while at school) and then retrieve that data on a different machine and in a different location (eg. if you are timetabling at home). You can do the same with the data in our **Options** program and in our **StaffCover** software.
[The Licence for **TimeTabler** and **Options** and **StaffCover** allows you to install a second copy at home as well as at school].

But 'Cloud computing' is more than that. It is the delivery of computing services, not just data storage but the processing of that data too within a 'cloud' version of the software.
This is SaaS (Software as a Service) or a 'hosted application'. Common examples are Outlook, Microsoft Office 365 and Adobe Acrobat Pro and an increasing number of school MIS systems.

The biggest single advantage is the ability to access the application (and data) from any location.
It is ideal for applications which are able to be 'multi-user'.
The biggest single disadvantage is that access depends on the quality of your internet connection, which may be slow, intermittent, or non-existent. In this case you cannot work.

There are other advantages, and disadvantages, summarised in this table.
There are more details about these advantages & disadvantages on the next few pages.

Advantages	Disadvantages
Access to the program and the data from any location.	Slow connection or complete loss of connection. Broadband connections go slow at times (perhaps because of other users) or stop entirely. If you have no internet connection you have no access to your data.
Automatic provision of the latest version of the software. You don't have to do any installation of upgrades yourself.	Downtime of the server No Cloud provider can claim total immunity to service outages, but they are rare.
Access can be by a PC or by a cheap tablet (which has little computing power of its own).	Data security and privacy Loss of sensitive data is a bigger problem for MIS than it is for timetabling software.
	Vulnerability to attack Nothing connected to the internet is perfectly secure.

Why do modern MIS use Cloud-computing?

More and more schools are moving to a Cloud version of an MIS (Management Information System) because of the clear advantages, for an MIS:

An MIS deals with large amounts of data, in real time. It's important that this data:

– can be updated, in real time, so that whoever accesses the data sees the latest current data.

– It can be used by a range of Users across the school. A teacher may be inputting attendance data for a class at the same time as an Admin Officer is updating a student's new post-code while someone else is updating their Test results, etc. This multi-user aspect is important for an MIS.

– can be kept securely. On the whole, private data on a remote server is less easy to hack than data kept in school, although perhaps it's more likely to be a target for hackers.

– and a cloud solution allows the staff to access their data at home, on any device (phone, tablet, PC) for example to set and mark homework for their classes.

A 'Cloud' MIS system also allows for easy scalability if the school's size changes, and it is usually cheaper as it obviates the need to employ local IT staff to support a local server.

However Cloud computing requires a constant, reliable, high-speed internet connection.

An MIS deals almost exclusively with current real-time data.
By contrast, timetabling software does **_not_** deal with current data. It deals with future data, potential data, 'What if...?' and proposed data. This is discussed on the next page.

Please Sir, I lost my homework in the Cloud.

Why is Timetabling software different ?

One of the most important things to understand is that the data needed for timetabling is not in the MIS! An MIS contains current data, whereas a timetabler uses *different* data. It is future or proposed data. So thoughts of an API being needed to transfer data regularly from the MIS are mistaken.

The data for next year's timetable is different from the data in an MIS because:

- The staff will be *different*. Some staff will retire or leave; new staff will be appointed for the new school year. A timetabler will often be timetabling 'XMa' as a new Maths teacher, name unknown, until they are advertised for, interviewed and appointed.
- A new Curricular Structure. The new timetable will often have a different structure, especially
    – a change in the number of attainment 'Sets' in Maths and English,
    – a change in the groups in option blocks in Grade/Year 10 (and 12)
- Subjects. Occasionally a school will introduce a new subject, eg. psychology or law.
- Rooms. (Rarely, a school may have new accommodation coming into use or may wish to change the labelling of rooms.)
- 'What if...?' scenarios. Timetabling software is often used to investigate possible scenarios. These will use neither the existing MIS data, nor even the data for next year, but hypothetical or proposed data that is being trialled as a possible way for the school to go. Eg. Can we afford an extra Maths set? Should we replace the leaving History teacher with a Geography teacher?

All these mean that there is little relationship between what the MIS is currently storing and what the timetabling software is working with.

When the new timetable is complete, and agreed, then – when the old school-year has ended, and before the new one starts – the data is transferred to the MIS as a single planned event.

A major revision may sometimes be needed during the year (eg. if someone goes on maternity leave, and a direct like-for-like replacement cannot be found), in which case the same procedure is repeated. Minor tweaks during the year (eg. room changes or direct teacher-swaps) are usually done in the MIS.

Other important aspects of timetabling, and differences from a Cloud MIS, are:

■ The scheduling part of the timetabling is usually compressed into a short timetabling season, where time is precious. It is essential that the software is *responsive*, as a local machine is.

But a Cloud version would be subject to the vagaries of the connection. A slow or 'flickering' connection would cause delays in timetabling at a critical time of year.
And if the broadband connection fails altogether then no timetabling would be possible!

■ And even if the connection is fast, the actual processing may not be. A popular new Cloud MIS currently states '*Once the timetable slots have been deleted, wait at least 20mins before importing the new timetable. This is so all lessons in the background will have been deleted.*'
Can you imagine waiting 20 minutes for part of your timetable to update!

■ If the User wishes to work in 2 locations (eg. school and home) that is possible with or without a Cloud system. The timetable data can be easily transferred from one machine to another via a single data-file on a memory-stick, or via Cloud storage using Dropbox, Google Drive, etc.

■ Unlike an MIS, timetabling software can never be truly 'multi-user'. This is logically impossible. The data can only be in one 'universe' at a time. Otherwise you might find one User trying to schedule class 7A on Monday-1 for Maths while another User is trying to schedule that class/ period with History, etc., ...and of course each single placement on a schedule then has a knock-on effect on every other item yet to be placed, so the sequence of placements is important.
This is equally true of all school timetabling software. (University timetabling is a different procedure.)

What about *Options* software ?

Options software is used by secondary schools to arrange their students' option Choices into the best arrangement or 'Pattern' which:

– achieves a high satisfaction, so that the students can study all the subjects they have chosen. This is important for the students' motivation and for Exam results.
– keeps down staffing costs, by finding a Pattern which doesn't need unnecessary staff.

There are good reasons for putting (at least part of) this software in the Cloud.
In fact, the **TOOLS** part of our *Options* software has been 'in the Cloud' for 10 years.

TOOLS allows students to enter their preferred Choices, ready for processing by the *Options* program. TOOLS is used, as 'multi-users', by pupils & their parents from home (on their PC, tablet or phone), or by the school's Careers or Guidance Counsellor while counselling students.

Once that information has been collected (by TOOLS as above, or using paper forms) it can then be processed by the *Options* program. And this program can be either installed on a local machine or as an application 'in the Cloud'.

Locally:
Running *Options* on a local machine has the advantages mentioned earlier:
• you have access whether or not there is a good broadband connection
• you get immediate response times.

Users can work at home or at school by transferring data by memorystick or Dropbox etc, as on the previous page.
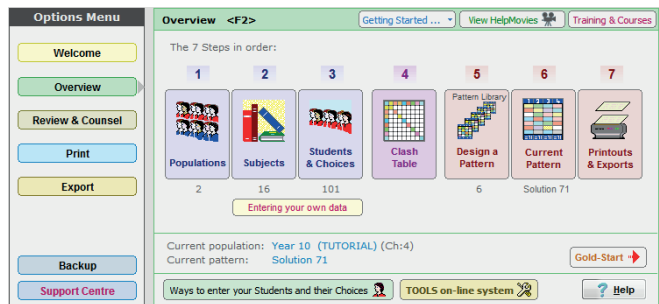
In the Cloud:
Urgency of response is usually not as important with *Options* as it is with timetabling.
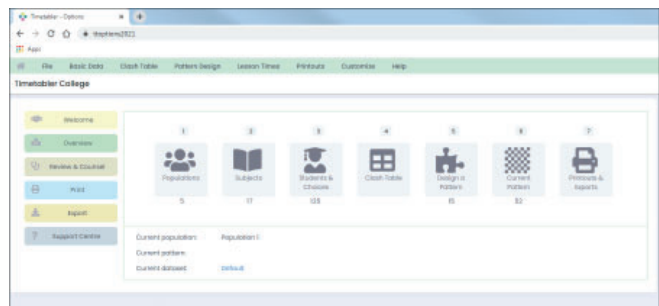
Whether working 'locally' or 'in the Cloud', once the best Pattern is found, and agreed, it is then transferred into the *TimeTabler* software, to be incorporated into the timetable.

Meanwhile the pupils' final Choices can be transferred into the school MIS.
This data-transfer can happen before the end of the school year, once the MIS has been prepared, after an annual 'roll-over'. This allows the school to prepare subject Groups ready for the new timetable.

Sir, my Dad says the Cloud
is the answer to everything