**System Implementation**

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| Start | Finish | Author | Description | Reason | Version |
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| 17/07/2017 | 19/07/19 | Vinicius | Conclusion and summary of implementation options | Highlight benefits and disadvantages of the implementation options. Highlight concerns for each section | 1.0 |
| 27/07/17 | 27/07/17 | Karanjit | Edited infrastructure section | Correct state of existing networks at venue. | 1.1 |
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**The Infrastructure**

Based on the current state of the venue, it is expected that additional equipment will be required to provide access to the wireless local area network for all MATHEX attendees. Both existing networks at the stadium have just one access point in the main gym area. More access points and repeaters would be needed to extend the range and capacity of the networks to accommodate for the MATHEX competition attendees. Moreover, depending on the choice of application solution and system implementation, the existing internet connections may not have sufficient bandwidth to handle the amount of traffic. In this case, solutions with the internet service provider will need to be explored. Note that this will likely be at the expense of the venue for any potential upgrades.

On the other hand, there is also the option of internet access through the user's own data plan, which will be at their own cost.

As a reminder, because the MATHEX event could take place in different venues in the future, the full assessment of the venue is not our main focus.

**Purchasing the Hardware**

The benefit of having all the servers at the same location where the MATHEX event occurs is that there is no need for internet access. The presence of Wireless access network (WAN) would satisfy the needs to run the application and connect all the users present at the event.

However, the equipment purchase costs can be very high. It should also be highlighted future costs, such as: the set-up of the system, transferring the server location, maintainability and labour. Additionally, a disaster management plan may be required to comply with venue's policies and general health and safety regulations, as well as to keep the data backed up and stored, and keep the competition running.

MATHEX events are infrequent. As we understand, those servers and any other equipment would not be used for the rest of the year which would could lead to waste of resources. The equipment will also need to be stored at someone’s expense, and be insured in the event that it is damaged, misappropriated or lost for any reason.

The MATHEX events seem to be increasing in popularity each year, this could lead to an issue. To scale the system to satisfy the demand may not always be feasible, it could require new hardware parts or servers as time goes on to meet up with consumer needs, replace old and worn parts and keep up with advancements in technology. To conclude, adding more capabilities to the system reapplies all the risks of implementing the system in the first place, costs will need to be calculated each time and will most definitely increase.

Therefore, we believe that purchasing and maintaining your own servers for this particular solution is not cost effective and is a misuse of resources.

**Using Cloud Solutions**

Using cloud solutions will require internet access, which means the internet bandwidth must support the traffic of data otherwise users will experience slowness when using the application.

There are different cloud services available, but many of them allow you to pay as you go, meaning you are only charged for what you use. With this feature, there is a significant reduction in costs, as the application and the resources necessary can be reserved whenever they are needed and paid accordingly. Furthermore, it eliminates any need or concern for servers. Their location, status, storage, maintenance and all other concerns listed above are of no consequence to the developers, client, venue or any other stakeholders. The companies that provide these services are responsible for their hardware and software.

In case the number of users increases, more resources can be purchased on click of buttons. For some cloud providers it adapts automatically and then it is charged accordingly.

It is evident that using a cloud service will be significantly cheaper than purchasing your own hardware. It will eliminate many headaches, and can be used at any place and time as long access to internet is available.

Note: It could be of the client’s wishes to purchase the hardware, if they are not readily available in AUT. The same system could be maintained at AUT's grounds and be provided over the internet. This approach would work over the internet similarly to the Cloud approach.

**The Technology - Conclusion**

After our assessment, we have concluded that the best option for the implementation of an application that satisfies the client's requirement and reduces short and long term costs is the use of cloud technologies.

It does not mean that Cloud services is better than having your own hardware but for this specific purpose the benefits of using cloud services instead surpasses the benefits of buying hardware.

As students plus the contribution of our lack of experience, we believe that the set-up of the servers will be complex and therefore, we cannot commit to the reliability of the system. On the contrary, using system already set up for us provides a higher chance of success.