

ICTS: Scheduled Maintenance Plan

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INTRODUCTION

The University of Cape Town Information and Communication Technology (ICT) Strategy identified the need to ensure appropriate levels of availability, stability, security and recoverability of services.

In order to deliver against this need and the UCT community's expectations, it is vital that all components and subsystems linked to the delivery of these services be properly and pro-actively maintained.

PERIODIC MAINTENANCE REQUIREMENTS

The following activities play a critical role in the life cycle of any ICT solution. It is therefore essential that these are addressed through appropriate and timely actions in order to ensure the availability, stability, security and recoverability of systems and services delivered to the UCT community.

- Application and Operating System security patches.
- Application and Operating System patches and upgrades
- Application and component installations
- Firmware upgrades
- Hardware upgrades
- Reconfigurations
- Server reboots
- Availability and fail-over testing
- Disaster recovery testing

The time required for a specific activity is directly dependent on the complexity of the work to be performed and whether or not any problems are encountered during the execution of the work. It is a known fact that if a server is going to fail, it is most likely to do so when it is rebooted. Similarly, patches for operating systems and applications are known to create problems despite rigorous testing, with a worse case scenario requiring a disaster recovery or vendor support.

CRITERIA CONSIDERED

The following criteria need to be taken into consideration when defining a maintenance schedule.

Why is a maintenance schedule important?

- **Hardware and software support contracts**

Support contracts usually require firmware and software to be maintained at a current level through upgrades or patches.

In the event that a support request is lodged with a vendor, this is normally the first aspect verified. In certain cases, the vendor may refuse to engage with the problem until updates, patches or fixes are applied. This increases the time taken to resolve operational problems.

Firmware and software patches and/or upgrades also serve as a proactive measure toward avoiding failures. It is thus essential to keep all systems current.

- **Reduce the number of scheduled maintenance slots**

In the past, maintenance was scheduled on an ad-hoc basis. The lack of certainty around the required time slots created uncertainty for those planning academic and administrative activities.

It was (and currently still is) necessary for ICTS to secure ad-hoc maintenance slots and this has in many instances led to critical maintenance being delayed or cancelled.

ICTS wishes to reduce the number of maintenance slots and to co-ordinate maintenance through a consolidated approach.

- **Minimise service disruptions to the UCT community**

Maintenance slots of 7 to 8 hours will be scheduled. However, interruptions to the UCT community may be brief depending on which system and/or service requires maintenance and the extent of the work involved.

- Maintenance on an individual server may last anything from 5 to 30 minutes on average. The plan should schedule seven to eight hours per maintenance slot due to the total number of servers and associated sub-systems that require maintenance.
- The level of redundancy established for selected applications in the new infrastructure allows support engineers to perform maintenance on one or more servers while other servers continue to provide services to the customers, albeit at reduced performance levels in some cases.

- **Emergency maintenance**

It is imperative that any plan cater for emergency maintenance. Emergency maintenance may be indicated when a system experiences a failure that impacts the UCT operational environment.

Vulnerabilities in software pose a tremendous threat to the security of systems. The current trends indicate an increase in the number of so-called "zero-day exploits". In the event that critical security fixes or patches are released, these must be applied immediately after testing and therefore cannot be delayed for implementation during the monthly maintenance slot.

The consolidated maintenance plan must cater for and allow for emergency maintenance to be scheduled. Emergency changes will only be considered if they conform to the ICTS change control criteria defining emergency changes.

- ***Project-related maintenance***

Where specific projects are established to introduce a new system to the infrastructure or upgrade an existing system, the project may make use of the scheduled maintenance slots, however it is envisaged that in certain cases the slots will not provide sufficient time, for example, an SAP upgrade. In these cases, the project will have to schedule a separate maintenance slot.

- ***Adhere to change control processes***

Strict change control processes must always be adhered to. Routine changes can be properly planned for and authorised prior to implementation. A maintenance plan ensures that changes to the UCT Enterprise ICT infrastructure are introduced in a co-ordinated and predictable manner and time frame. Only emergency changes should be considered for implementation outside of scheduled maintenance slots.

What factors influence the timing of scheduled maintenance?

- ***Minimise risks associated with maintenance***

- **Vendor support**

Vendors may be required to assist with certain activities. Vendor availability after hours is in certain cases a challenge, particularly if the intervention of a senior engineer is required. The risks associated with maintenance are high and therefore the associated need for vendor support to be available is at its highest. In order to reduce risk, maintenance should be scheduled during daytime hours.

- **Extent of the work to be performed**

Maintenance procedures may take anything from a few minutes to a number of hours. In the majority of cases maintenance will require between 4 and 8 hours. A single patch may take up to 20 minutes to apply to a single server operating system and the UCT enterprise-computing environment is complex and consists of many servers and services. A full days work will often be required.

It is important that staff be alert and focussed when performing maintenance. Personnel that have worked a full day are not able to perform optimally and remain focussed if required to work during the evening for another period of up to eight hours. If work is performed during the week-day evening, then the engineers who performed the work will not be available the next morning to tend to operational requirements. A similar scenario may occur if problems are encountered during a Sunday maintenance slot.

It is a reality that those ICTS engineers responsible for the maintenance effort are the same individuals who are required to tend to normal operational requirements. The availability of engineers during working hours is vital to ensure that problems experienced with core services are addressed immediately thus reducing the impact to the UCT community.

- **Database and system backups**

Database and system backups are vital for any level of data recovery and are particularly essential for any disaster recovery plan. All database and systems backups run during the evenings and early morning to ensure that the backup

processes do not impact system performance during working hours. This includes PeopleSoft, SAP, Email and file services.

If maintenance is scheduled during the evenings, the backup processes are interrupted, considerably raising the risk of a loss of data in the event of a disaster or catastrophic failure. Maintenance procedures also rely on the fact that backups are available in the event of a major problem.

- ***UCT academic and administrative calendar***

Due consideration needs to be given to the UCT academic and administrative calendar. This along with the other criteria and factors listed below must inform any monthly consolidated maintenance plan. Planning is essential for a large organisation in order to achieve its operational and strategic objectives. A scheduled maintenance plan for ICT services at UCT, will allow ICTS to contribute toward the achievement of UCT's objectives. It will also reduce operational risk, scheduling conflicts and general confusion around maintenance scheduling.

- ***Consideration for peak periods of utilisation***

Network utilisation graphs show that while utilisation peaks during the working day, the weekday evenings tend to represent more utilisation than Saturdays and Sundays.

- ***Sufficient time to complete maintenance activities***

Sufficient time is required to perform the maintenance activities. The plan should also cater and allow for problem resolution time. Sundays and week-day evenings are problematic in that should a serious failure occur, the issue may not be resolved by the next working day, thus impacting UCT's core functions.

MAINTENANCE PLAN

While Sundays are not optimal for reasons already referred to in this document, UCT business operations make it difficult to select any other time or day. Therefore, a single monthly maintenance slot will be scheduled from 09:00 until 17:00 every third Sunday of each month. Should supplier constraints, or specific UCT events, prevent the utilisation of the scheduled maintenance slot, the maintenance slot will be scheduled for an alternative Sunday within that that month. However, a maintenance slot should not roll over into the next month. It should be noted that while the maintenance window is scheduled for eight hours, the actual interruption of services, and therefore disruption to the UCT community, are typically brief.

Information about the maintenance slots will be published on the ICTS web site and in the UCT academic calendar. All faculties and departments are encouraged to monitor the ICTS web site for additional information.

While ICTS will make every attempt to ensure that maintenance is restricted to the above mentioned slots, emergency maintenance may need to be performed outside of the monthly schedule, the same applies to certain work carried out by dedicated ICT projects e.g. SAP upgrades. In such cases, the UCT community will be notified of the pending maintenance activity. Such notification will take place using the following channels: email to icts-announce-l mailing list and an article on the home page of the ICTS website. Any such notice should precede the emergency maintenance by a minimum of 60 minutes prior to implementation. Longer prior warning to the community is preferred.