

Mobile Technology Strategy

For Stellenbosch University

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Scope

The Mobile Technology Strategy (MTS) does not purport to be an institutional mobile strategy nor an “m-learning” strategy nor a mobile communications strategy¹. Such strategies address *how* mobile technology is to be *used* and applied in, and to improve, various academic processes and achieve university missions. The MTS limits itself to the architecture, design and development, provisioning and operations of mobile technology and platforms. In this sense, mobile technology is treated as an *enabler* of the application of mobile devices and platforms in academic processes and missions in order to realise the Rector’s vision for a “21st century university in Africa”.

Definitions

For the purposes of the MTS the following definitions apply:

Mobile ‘framework’ refers to the tools, styles, layouts and code that are used to design and develop user interfaces for mobile devices.

Mobile ‘platform’ refers to application server software that serves mobile web applications and integrates to the rest of the information system and infrastructure ecosystem.

‘Mobile’ refers to all forms of mobile devices such cell phones and tablets, but excludes laptops and notebooks.

‘Native apps’ are applications that are developed for a particular type of mobile device and are downloaded to and installed on the device.

‘Web apps’ are applications that run on a central server and render and work in a web browser on the mobile device.

Governance

The Mobile Technology Strategy is owned by the Information Technology (IT) Division, whose responsibility it is to sign off on the strategy and ensure its execution. However, campus stakeholders are able to contribute to the strategy’s evolution via the SU Web Committee and its technical sub-committees.

The SU Web Committee is the institutional custodian of the institutional Web Policy (currently the Web Regulation) which governs how web technology, including mobile technology, is employed in executing the university’s missions. The SU Web Committee is chaired by a representative of the IT Division.

Informing the strategy with fact

Web statistics for North America and Europe, where most mobile technologies hype emanates from, show that Apple’s iOS and Google’s Android mobile operating systems (OS) have assumed dominant positions². In fact, Gartner, the ICT consultants, expect Android to overtake iOS during 2012 and gain market share at the expense of every other OS, with the exception perhaps of Microsoft’s OS

¹ The authors wish to emphasise that mobile-related strategies such as m-learning and m-communications should be developed and that they are willing to participate.

² StatCounter network’s statistics at http://gs.statcounter.com/#mobile_os-na-monthly-201101-201201

(Windows Mobile). By contrast Blackberry's OS and Nokia's Symbian are lagging far behind and trending downwards.

It is therefore unsurprising that most software platforms, such as the Blackboard learning management system for instance, which are mostly created in North America, target the "global north's" demographics. Blackboard's mobile offering is centred around iOS, Android and Blackboard OS.

However, in **Africa and South Africa**, where mobile technologies have empowered huge numbers of people while enabling them to skip the traditional fixed-line and Internet-access paradigms, **very different realities** hold sway. While our own ICT survey of students³ confirms that mobile access to the Internet is relatively high, a subsequent survey of students in three faculties⁴ (Figure 1) shows that most students have Blackberry or Nokia mobile phones⁵. About 94% of students' mobile phones are web-enabled.

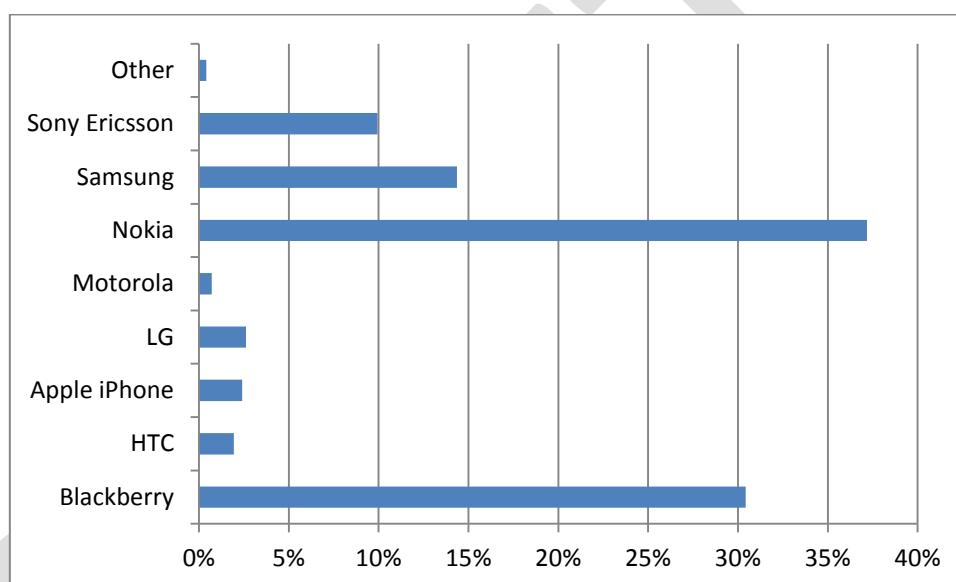


Figure 1: Student cell phones in 3 faculties (Survey during semester 1, 2011)

Data presented by Google at last year's Think Mobile event⁶ (Figure 2) confirms this observation for the whole of South Africa: 59% have Blackberry OS or Symbian OS, while Google Android and Apple iOS jointly account for only 12%.

³ Bosman, J.P. 2011. *ICT Survey Students 2011*, Centre for Teaching and Learning, Stellenbosch University.

⁴ IT Division. 2011. *Survey of student mobile ownership in 3 faculties*. Semester 1.

⁵ An important exception is noted at the university's Business School where the penetration of iOS and Android amongst business post-graduate students is 92%.

⁶ <http://mybroadband.co.za/news/gadgets/38267-most-popular-mobile-os-and-smartphone-brand-in-sa.html>

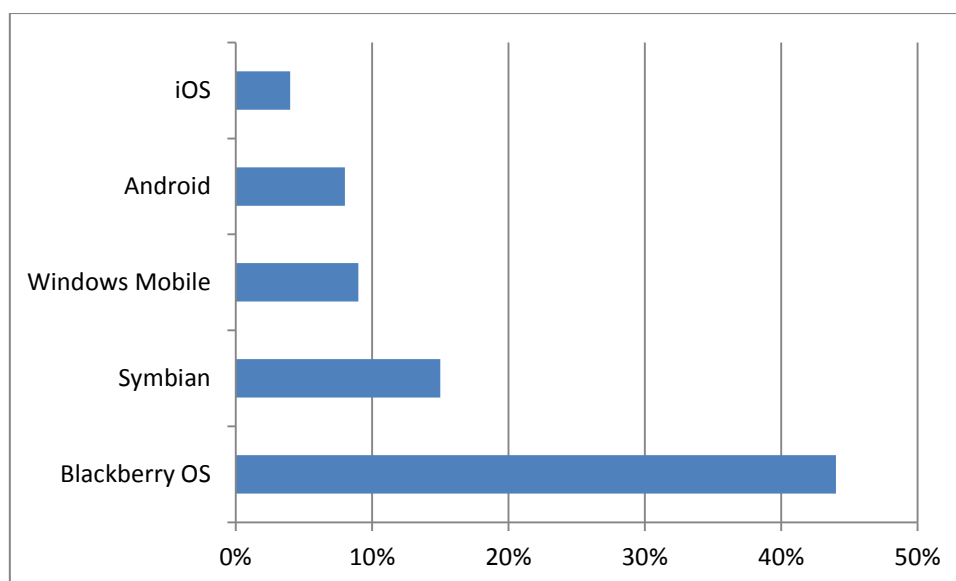


Figure 2: Most popular smartphone OS in South Africa (source: Google, November 2011)

The MTS must acknowledge these realities and plan for them, while recognising that the picture could change rapidly.

Assumptions

The following assumptions inform the MTS:

1. Wifi connectivity will not be ubiquitous on campus during the next two years. Most students will connect via their personal broadband accounts⁷. One implication is that mobile applications must be bandwidth efficient.
2. The demand from the university community for mobile services and applications from the university will escalate exponentially.
3. Students and staff will bring their own mobile devices to campus and will expect to connect to and interact with institutional services and information.

Strategic Objectives

1. The mobile platform and framework should make the creation of a **seamless and consistent user experience** across devices, services and applications possible.
2. The mobile platform must enable university entities to **easily target mobile-appropriate content and services to mobile channels** and selected audiences within those channels.
3. The platform and framework must **be flexible and agile enough to accommodate most mobile devices and technologies** as they evolve.

Guiding Principles

The university will strive to adhere to the following guiding principles:

1. The architecture will be **device agnostic** but will take the dynamics and preferences of the local mobile device and connectivity markets into account (in other words, trends in the USA and Europe will not be blindly adopted).

⁷ It should be noted that 3G connectivity is poor on the main campus during term, mostly for customers of a particular network.

2. The platform and framework will not send code or media to a device that is incapable of digesting it, so that the user experiences **graceful degradation** and not a complete loss or failure of service.
3. The back-end platform technology should **not dictate** the front-end technology and *vice versa*. The framework and platform should not impose strict limitations on the type of mobile brands that are able to interact with institutional mobile services.
4. The platform should be **scalable** under load and numbers of users, and **lightweight** i.e. not overly complex.
5. The framework should facilitate a **coherent user experience** irrespective of where the data and applications reside physically.
6. The framework and platform should **conform to modern, emerging web and mobile standards and best practices**.
7. Applications and functions should be designed for and deployed on **mobile where appropriate**. Not every desktop or web application needs to go mobile.
8. Decisions about developing, maintaining and retiring mobile applications will be **data-driven**. All applications should consequently be instrumented to produce usage analytics and user feedback should be actively sought.
9. Students will bring and expect their devices to interact with the university's mobile services. This does not preclude the recommending of minimum device standards, however.

Technology architecture

Architectural decisions

Every mobile application has a target audience which requires the implementer to select the appropriate technology according to the requirements of this audience. It is recommended that the Web Technical Committee, a sub-committee of the SU Web Committee, is consulted when selecting the technology for the application or service.

The Web Technical Committee's recommendations can be considered by the IT Architecture Forum, and the Manager: IT Architecture will make the final decision, having obtained the support of the IT Directorate.

Mobile device application models

Mobile applications can be created in four ways: mobile compliant, mobile optimised, hybrid and native. The first two are web implementations, while "native" refers to an application that is created for a specific device. "Hybrid" applications "wrap" web applications as native applications.

Figure 3 depicts the four application models against the quality of the **user experience** and the complexity of creating and maintaining the application across multiple devices. Specifically, "**complexity**" refers to a combination of: multiple codebases in various languages, varied skillsets required and availability of those skills, and the associated growth in the challenge of maintaining multiple applications for different devices.

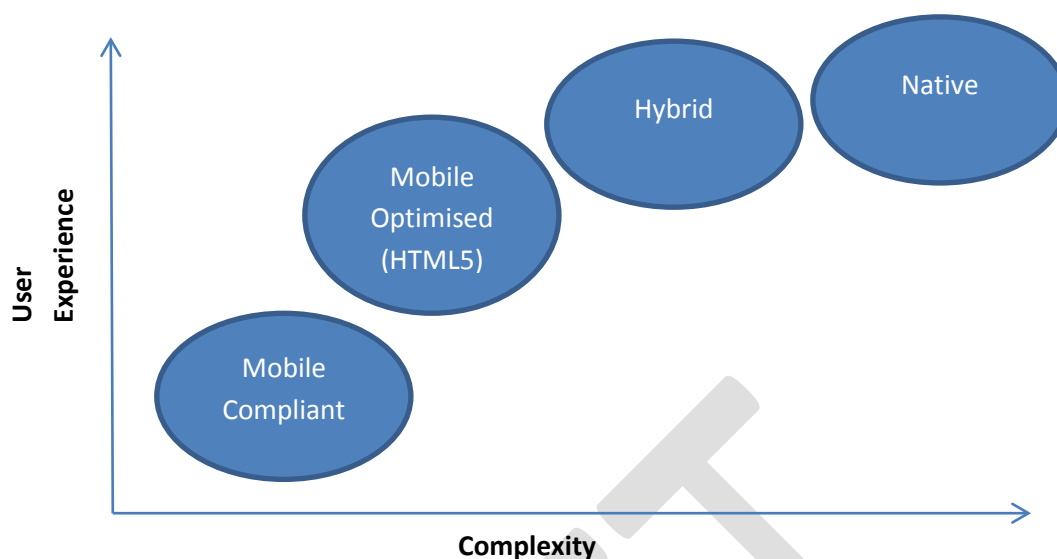


Figure 3: Mobile device applications UX vs complexity

Given the resources at our disposal, the university will strive to mostly create and maintain **mobile optimised applications** that are created once for multiple devices, while recognising that user preferences may sometimes demand native app-like experiences i.e. a “hybrid” app.

There will, however, be a place by exception for specialist or academic “native” applications that utilise the onboard services of devices such as the GPS, accelerometer, camera, etc.

The IT Division, on the advice of the Web Technical Committee and the IT Architecture Forum, will select a mobile framework (e.g. JQuery Mobile) and a mobile platform (e.g. uMobile) that will enable the principles and models described in this strategy to be satisfied.

Services architecture

In general, the mobile platform and framework will consume institutional information services via a well-defined services interface. Consumption of services will be brokered by a system that is able to identify the consumer system, require authentication, grant and revoke access, track usage and keep audit trails. A mobile consumer system will never be able to directly call a service; the brokering system will always intercede.

The services architecture should also enable participation by third party developers, for example the student community, in developing secure mobile services and applications for the campus.

High-level timeline

The strategy addresses the short-to-medium term (6 months to 1.5 years) given the rapid rate of change in mobile technology.

Action Plans

The following Action Plans are defined:

1. Select a preferred mobile framework and mobile platform by end March 2012. The Web Technical Committee will investigate and make a recommendation.
 - a. Implement the framework and platform as soon as possible thereafter. For action: Manager: IT Architecture.
2. Conduct an annual or 6-monthly survey of students' preferences for mobile devices: what they have now and what they intend upgrading to and when. For action: Director: IT (Services & Operations).
3. Prepare a university-wide *recommendation* for the minimum standard mobile devices on an annual basis. For action: Director: IT (Services & Operations).
4. Initiate an action to negotiate provisioning of iOS, Android and possibly Blackberry OS mobile devices to students under attractive terms with the mobile industry, under the banner of regional or national higher education consortia, in order to be able to target fewer, high-end devices with native apps. For action: Senior Director: IT.
5. Prepare a plan for the proposed Student IT Support Centre to increasingly support mobile end-users on campus. For action: Director IT (Services & Operations).
6. A core group of developers (at least two) must be identified and the members of the group must skill themselves up on the framework and platform by end June 2012. For action: Head: Software Development.
7. Third party development:
 - a. The services architecture must be evolved to enable third-party development of secure mobile applications and services. For action: Manager: IT Architecture.
 - b. When the architecture is ready enough to permit third-party development, steps should be taken to create an on-campus development community for mobile, develop a set of procedures and rules within which it can function, inform it of the rules and procedures, and establish and operate a forum that co-ordinates this activity. For action: Head: Software Development.

Strategy Review

It is obvious that the strategy will be dynamic and will probably have to change rapidly to keep pace with technological change. The Strategy should be reviewed at least every 6 months by the Web Technical Committee which can comprise the members of the project team which developed Version 1.0 of the Strategy.

The Strategy and its subsequent versions should also be reviewed by a reference group of domain experts that could include members of the Media Lab at Electronic Engineering, a mobile development expert from Mathematical Sciences (Computer Science) and academics from Information Science and the Business School.

Acknowledgements

The authors wish to acknowledge the influence of the principles contained in the University of California at Los Angeles' Mobile Web Framework on their thinking in preparing this strategy.