

Application Form

Institution Name: University of Nottingham (UoN) and Nottingham Trent University (NTU)

Originating Department:

UoN: Information Services

NTU: Information Systems

Contact Name (and email address):

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NTU: Ian Griffiths, Director of Strategic Partnerships, Ian.Griffiths@ntu.ac.uk

Objective of the Connected Nottingham Wireless Students Pilot Project

The University of Nottingham and Nottingham Trent University have both identified the use of wireless technologies as strategically important in the delivery of information resources to both students and staff. During 2004, the Universities engaged with Accelerate Nottingham¹ to explore the collaborative opportunities for promoting ICT as a key influence in determining the future prosperity of Greater Nottingham, specifically utilising wireless technologies. Out of this collaborative effort grew the Connected Nottingham Wireless Students Pilot Project. The project's basic aim was to provide a number of on and off-campus wireless hotspots which could be used (free of charge to the student/staff member) to access the internet. The hotspots should also be able to take on-campus visitor traffic to the Internet.

The strategic objectives of Connected Nottingham Wireless Students Pilot Project were:

- to assist with the creation of Nottingham City Centre as a wireless digital access area;
- to improve the attractiveness of the City Universities in the eyes of students;
- to facilitate further engagement between the Universities and the local community (hence contributing to strategic objectives);
- to increase the numbers of students accessing online services, particularly for social learning and collaboration;
- to improve the availability of remote network access points for students and staff;
- to accommodate internet connectivity for members of the public visiting the University sites – particularly in social areas such as arts centres, galleries, gardens and cafes/restaurants;
- to encourage a flow of students between the two City campuses.

¹ *Accelerate Nottingham is a joint public, private and voluntary sector partnership, which aims to be the major catalyst for change in leading, shaping and transforming ICT within the Greater Nottingham conurbation and the County, supporting workforce, business, education and community.*

The operational objectives were:

- to provide 25 wireless hotspots on each of the University Campuses and 35 in City centre social locations (bars, cafés and public areas such as the train station). Appropriate systems integration technologies, would ensure secure access by all members of students and staff from both institutions and be fully integrated with existing on-campus provision;
- to develop a technical infrastructure which would support the use of these, and additional hotspots, for the foreseeable future, and allow seamless integration of services at other educational institutions in the City and East Midlands;
- to ensure that any developments were compatible with wireless initiatives within the two Universities and the Location Independent Networking (LIN) /Janet Roaming Service projects;
- to facilitate a blurring of the boundaries between on and off-campus usage for University members and securely open the Universities' networks for use by visitors, where appropriate.

The future objectives are:

- to increase the number of off-campus hotspots;
- to widen the scope of the project to include the City's other Higher and Further education institutions.

Description of the Connected Nottingham Wireless Students Project

The Connected Nottingham Wireless Students infrastructure was developed collaboratively between networking staff from the two Universities and our third-party vendor (TeleGeneration Ltd) and continues to evolve. Its basic aim was to provide a number of on and off-campus wireless hotspots which could be used (free of charge to the student/staff member) to access the internet, authenticating against the relevant University's username/password database. The hotspots should also be able to take visitor traffic via TeleGeneration's authentication system.

The design of the system should be such that it was easy to use (a potential of 50,000 students would require supporting) and integrate fully with any other wireless provision in the partner institutions. Since both institutions had good wireless coverage in most academic areas, the underlying concept for the project was to enable and engage the social aspects of research and learning.

Technically, the design should accommodate non-academic traffic independently of the academic network.

Wireless Access Points

Twenty five Wireless Access Points were installed in locations on each campus, with both Universities targeting social areas and areas in most need of the resource. To ensure future-proofing of the infrastructure, all on-campus points have 100Mb uplinks, although currently can only operate at speed of up to 54Mb.

Students' suggestions regarding the location of the off-campus points were

canvassed via the Students' Unions, surveys and feedback sessions. To date there are 35 off-campus points in locations close to the campuses such as bars and cafés, and social areas such as the City's Market Square and bus station. A full list of venues can be found at <https://www.telegeneration.com/venue/venues.php>.

Technical Integration

The Connected Nottingham infrastructure was integrated into the existing campus wireless infrastructures using technologies developed alongside the LIN project (the two Universities are members of a five-member East Midlands Metropolitan Area Network consortium). For authentication, a captive portal authentication gateway, based at the UoN, sends authentication requests to the Radius service which forwards requests to the appropriate University's Radius server and this then authenticates against the institution's central authentication database. Non-university traffic is authenticated by TeleGeneration against its databases hosted at the University of Manchester and the UoN.

Routing of Traffic

Much consideration was given to the routing of traffic onto the Internet, in order to ensure information security and legal compliance. Academic traffic from each campus is routed onto Janet, and non-academic traffic is routed via an internet leased line provided by UoN. To facilitate this, virtual LANs were implemented to connect access points to the authentication gateway across EMMAN and the campus networks.

The off-campus points route all traffic via ADSL to TeleGeneration's identical authentication gateway hosted at the University of Manchester, after which academic traffic is similarly routed via Janet and non-academic traffic directly to the Internet.

Promotion, Support and Advice

Throughout the Pilot project, the Universities have been working together and with Accelerate Nottingham to promote the project and ensure that appropriate support and advice is provided for users. The project was officially launched to the City at the Broadway Cinema in March 2005, and TeleGeneration provided information for stands at both Universities' Freshers Fairs. Advertising has even extended to the City's trams, which list the available off-campus hotspots.

Ongoing support and advice is integrated into the Universities' existing IT Support provision via laptop clinics and advisory services.

The Challenges

The Universities have faced a number of challenges during implementation of the project.

- **Social inclusion of the local community.** The partnership is seeking to broaden the benefits of the wireless network to facilitate affordable accessibility in the public areas by the development of kiosk terminals;
- **Health concerns about wireless radiation.** A few concerns were raised about the health effects of wireless networks. The Universities' have sought expert opinion on this including that of our own medical research community to allay fears;
- **Commercial competition.** BT Openzone, "Cloud" Partnerships, and other commercial wireless services. The project has concentrated on delivering services in locations which previously did not enjoy any connectivity;

- **Data Encryption.** In order to provide easy accessibility the service is currently not encrypted. Development of 802.1x capability is now taking place to authenticate and secure the service end to end;
- **Coverage of large open spaces.** Wireless access points traditionally need to be served by data and power connectivity. Coverage was required in larger open spaces in Nottingham such as the Market Square, where it was not possible to connect every access point. This was solved by developing a wireless Mesh where the access points receive network interconnection from adjacent access points, and only require mains power, which has been served from innovative locations, for example from street lamps.

Ongoing Service and Future Developments

The service will move from its pilot phase to full service early in 2006. The service continues to evolve and we aim to add more off-campus hotspots, move toward the use of multiple SSIDs to facilitate flexible use of existing on-campus points, and introduce 802.11i (WPA) security standards in the forthcoming year.

Summary

Use of innovative techniques has integrated "University" and "public" networks via a seamless interface, enabling efficient use of wireless technologies and encouraging the local community to use the Universities' campus facilities. This has allowed the IS departments to contribute to the Universities aims to further develop links within the local community and consolidated the already close links between the institutions. Students are also able to use hotspots at Telegeneration's other sites in Manchester and Preston. The Universities are seen to have taken the lead in a City-wide initiative which will hopefully extend to other Universities in the region and Further Education institutions in the City, facilitating transference of best practice. Several other public organisations based in the City have already benefited from the knowledge gained during the project.

Supporting documentation about the Connected Nottingham Wireless Students Project

Supporting documentation can be found in the Appendix.

Other Useful websites

<http://www.nottingham.ac.uk/is/services/network/connected-campus/index.phtml#cn>

<http://www.acceleratenottingham.com/>

<http://www.connectednottingham.org.uk/>

<http://www.telegeneration.com/index.php>

Name of Staff involved (including job titles and email addresses)

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Support of Institution UCISA Representative

We have very much enjoyed working together on the Connected Nottingham Wireless Students project, which has been a further extension of the initiatives we have collaborated on in the past. Usage figures for all of the hotspots (see Appendix A) continue to increase and both institutions are committed to the continuation and improvement of the service. We believe that the successful implementation of the project demonstrates excellence in many of the areas examined by the awarding body, in particular in the areas of

- Innovation
- Systems integration
- Leadership
- Integration of wireless technologies into campus networking
- Collaboration

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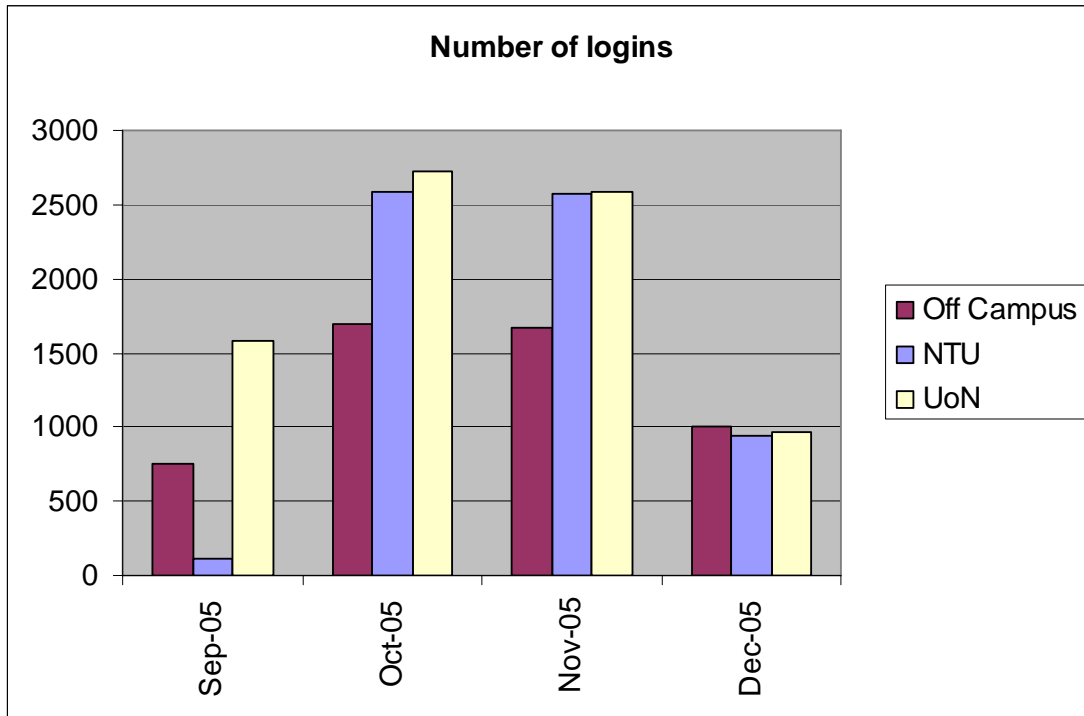
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Appendix A

Monthly comparison statistics for off-campus and University venues.



Appendix B

Connected Nottingham login page

Registered Users
User Name

Password

Install CA Certificate
Help

powered by
bluesocket
www.bluesocket.com
© 1999-2005 Bluesocket Inc.



Welcome to TeleGeneration in Nottingham

Please enter your username and password on the left hand side of the screen and click the 'Log In' button. You will then be able to use the TeleGeneration wireless internet service from your current location.

Use the links on the left below for more information on this service, and more....

Technology & ebusiness Expo 05 Registration [Click Here](#)

Find out
More

University Staff/Students:



Register
Now

No need to register. To sign in use:
UniversityUsername@nottingham.ac.uk
and your appropriate University Password
to log in for free.

No need to register. To sign in use:
UniversityUsername@ntu.ac.uk
and the appropriate University
Password to log in for free.

Free
Travel
Info

For example, if your username is **egyabc**
then you would use
egyabc@nottingham.co.uk to log in.

Our
Hotspots

Further Information

Use the links on the left to find subscribe to the TeleGeneration service, find out more information, get help, and **find out travel information for free**. Travel information is brought to you by [triptimes](#), which provides travel information for Nottingham City Transport bus services and the NET Tram service

Help