Draft Report On The Trial of ‘Digital Doorway’ Technology in Remote Indigenous Communities

for the

Department of Broadband, Communications and the Digital Economy

May 2013

(Photograph provided by Wunan Foundation, Kununarra, WA)

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For next version:

* inclusion of URL for the Living Change vision - http://wunan.org.au/living-change (would love to see a little DD icon in the picture)

* it would be good to mention specifically the development of a SIP interface for the DD in section of Changes.

Summary of findings

Information and communication technologies (ICTs) are a major enabler of economic and social development within nations and communities throughout the world yet even in western developed nations there remains a “digital divide”. Where there is no access, communities are severely disadvantaged and children’s education is hampered.

In remote Australian indigenous communities, the digital divide is significant with most remote communities having little or no access to digital technology. The installation of three Digital Doorways R1 (DD) using NBN Co Limited Interim Satellite Solution, in the remote communities of Burraluba Yuru Nguurra (Halls Creek WA), Binjari Top Camp (NT) and Bana Yarralji Bubu (Shiptons Flat) (Qld) was funded by the DBCDE, and was designed to help ease the digital divide. DDs are robust, free standing computer terminals with vandal resistant screens, keyboards and touchpads, designed to run 24/7 in the harshest conditions.

The results of the trial which ran from mid-November 2012 to April 30th 2013, demonstrate that the DDs are a valuable community resource. It has also encouraged digital literacy in all three communities. Usage data provided by the communities, electronic usage data and visits and observations by APN confirm that:

- All the communities expressed strongly that they wanted the DD facility in their community to continue.
- Community members with relative ease have been able to interact with and use the terminals.
- The DDs are being well used by both children and adults. Both groups are accessing a wide range of Internet based material but also accessing the non-Internet-based content provided.
- Children, not surprisingly, learned how to use the DD very quickly and are using the DD extensively for educational purposes.

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1 Digital Doorway R is a registered trade mark of CSIR Meraka Institute
• Adults are using the DD to conduct Internet banking and purchase goods online (this of course was previously not possible for most if not all community adults because of the lack of computer technology and Internet access).
• The DD, in Halls Creek has the potential to support and the Wunan Foundation Living Change program.
• Should the DBCDE or another government department consider rolling out DDs more widely research will be needed to establish the most useful and suitable content for communities, and the physical and technical design should be optimised for Australian conditions.

Overview of the DD

The Digital Doorway™ was designed and developed by The Meraka Institute which is the ICT division of South Africa’s Council for Scientific and Industrial Research (CSIR)². To date 200+ DDs have been installed across South Africa and Uganda. CSIR drew on the Hole in the Wall project in India ([http://www.hole-in-the-wall.com/new-way-to-learn.html](http://www.hole-in-the-wall.com/new-way-to-learn.html)) which aimed to stimulate children’s learning in an open playground setting with technology that was freely available and available all the time. The Hole in the Wall Education group believes that “the unstructured nature of this setting also ensures that children themselves take ownership of the Learning Station by forming self-organized groups who learn on their own. Finally an unsupervised setting ensures that the entire process of learning is learner-centric and is driven by a child’s natural curiosity.” CSIR extended the concept to facilitate access for adults as well as children developing a three terminal, robust kiosk which can be installed and run without the need for supervision enabling access to the technology and the Internet 24/7. In South Africa, the DD installations include solar panels providing power where there is none and a satellite dish for Internet connectivity where needed.

These ideals helped shape the Australian pilot. The pilot was designed to improve our understanding of the potential of the DD to enhance computer literacy, facilitate learning and bring internet access to three smaller remote Indigenous communities. Through the provision of Internet access 24/7 with content and computer capability similar to that found in most white Australian households, the trial brought technology to those who are the most disadvantaged in our society. Unlike an internet café, a DD does not need to be supported by any staff, it is sufficiently robust to be vandal proof, it does not suffer from various technical issues that occur in Internet cafes and it requires minimal technical support.

Installation (APN)

The Digital Doorway deed between DBCDE and APN was executed on 26 June 2012 to purchase, install and maintain 3 Digital Doorway units at 3 different communities for 6 months trial. APN was also involved in selecting suitable communities for Digital Doorway units. APN visited multiple communities for the site survey. Site selection was one of the most challenging parts of this project. Most of the communities were not suitable for Digital Doorway units. One of the basic criteria to install Digital Doorway unit is it needed to be installed under a building or a deep veranda to protect it from extreme weather, many of the communities were not able to pass this basic criteria. One of the original nominated communities in NT was not interested to be part of this trial and another community in QLD had no strong community leadership and also had no suitable power available.

In mid-October DBCDE and APN agreed 3 eligible communities to have Digital Doorway units installed. The three communities are:

- Burraluba Yura Ngurra Workers’ Hostel – Approx. 5kms South of Halls Creek, WA.
- Binjari Top Camp – Approx. 15kms South-West of Katherine, NT.
- Bana Yarralji Bubu, also known as Shiptons Flat – Approx. 35kms South of Cooktown, QLD.

Digital Doorway units were delivered to APN’s warehouse in Preston, VIC in the third week of September 2012. APN and researchers from Monash University started working on pre-installation of the units to configure them to meet the requirements. Monash University staff were actively involved in the reconfiguration of the software provided with the units.

APN worked on implementation of the reconfigured software, electrical compliance and interconnection with NBN equipment. APN implemented a full Content Filtering solution for the DD units, and certification testing showed that this solution was highly effective at blocking unsuitable content. APN is approved by the Internet Industry Association as a Class 1 Family Friendly ISP.

All 3 Digital Doorway units were configured and shipped to their destinations in November. One unit was sent to Cairns for installation at Bana Yarralji Bubu and two units were sent to Darwin for installation at Binjari Top Camp and Burraluba Yura Ngurra. Installation of NBN
equipment at Binjari Top Camp and Burraluba Yura Ngurra was completed prior to APN’s visit to install Digital Doorway unit.

There was some confusion between the NBN installer and the community at Burraluba Yura Ngurra regarding the location of the satellite dish. The NBN installer installed the satellite service at wrong building at the community, APN organised to relocate the NBN service to the correct location when the Digital Doorway was installed. Because of technical issue at NBN the end installers spent additional hours at Burraluba Yura Ngurra to complete the Digital Doorway installation. During the process of relocating the NBN service Hostel’s administration office lost their internet service, the APN installer configured the NBN service to enable sharing of the service between the DD unit and the administration office. December 17 saw a second NBN service installed for the office.

Bana Yarralji Bubu had an existing NBN service at the Ranger’s office, DBCDE agreed to temporarily share the office NBN service between DD unit and office computers until the additional NBN service application was processed. The second NBN application was processed in 2013 and an additional service was installed on February 20 2013.

Installation of Digital Doorway units at all 3 communities were completed in November 2012.

- Bana Yarralji Bubu – Installation completed on 14 November 2012
- Binjari Top Camp – Installation completed on 21 November 2012
- Burraluba Yura Ngurra – Installation completed on 23 November 2012
Technical issues (APN)

Consistent with the experience in South Africa there were no technical issues. The experience in South Africa has been that even after continuous use for approximately 3 years only some keyboards have needed to be replaced because they have worn out. All units in the trial operated as expected, there were no failures of software or hardware.

Comments were made with respect to the software. All the software on the units was provided by Meraka and had a strong African bias as would be expected. As much as possible material that was very specifically African was removed. It is clear however that the units need to look more like the Windows operating system as this would help with usability and the content more in line with what is needed in Australia.

During the 6 months Digital Doorway trial period no major technical issue was reported. Performance of NBN service was stable and no issue regarding NBN internet connection was reported. There was a power surge at Bana Yarralji Bubu after which they forgot to plug the power cable back in. A community representative helped to resolve this issue remotely, but was not able to identify the actual issue. APN visited this community with the SLA (5 working day) and resolved the issue. Apart from this no other issue was reported. Representatives at all 3 communities have maintained the units very well. They also organised regular cleaning and the units have been looked after very well.

Training provided and response to training (APN)

People at all 3 communities have been very supportive and were always happy to help. APN Install team trained community representatives and also other residents at all 3 communities in operating and in basic troubleshooting steps of the Digital Doorway unit. The APN personal then provided guidance to other people in the community as available for example the local Rangers at Bana Yarralji Bubu. The community representatives also provided weekly reports that APN developed to collect user information. Community representatives also handled regular cleaning of the units and reported to APN if there were any issues with the units. Community representatives are:

- Michael Polkinghorne – Burraluba Yura Ngurra
- Bev Patterson – Binjari Top Camp
- Marilyn Wallace – Bana Yarralji Bubu

The training provided proved effective, and APN received no calls for assistance with how to use the units during the trial period. APN believes that the “train the trainer” strategy worked
well, particularly in the Indigenous culture where freely passing on information is part of their way of life. At one installation the wife of the manager took the time to show people how to use internet banking, children showed other children and adults how to use the DD. APN installed links to the DBCDE Cybersafety website and Guide to Socialising Online on each unit and this was highlighted to the communities in the training.

**Overview of locations – separate short summary from each location (JF/APN)**

Given that three locations, in three different states were selected for the trial, this has provided an opportunity to explore how the installations were used and managed in different places and environments.

All three communities were very positive and grateful that their community had been chosen for the trial. They all indicated that they wanted the DD unit to remain on a continuing basis. All think it is an enormous asset for their community, helping community members in many different ways including educationally and socially.

**Burraluba Yura Ngurra, Halls creek (WA)**

The hostel is managed by the Wunan Foundation. Wunan see housing as an integral part of their ‘Living Change’ program. This program would provide housing for families under certain conditions. “Living Change is a community-led, place-based initiative for cultural, economic and social renewal in the East Kimberley. It is driven by Wunan’s belief that Aboriginal success comes from investing in people’s abilities, providing real opportunities, and encouraging and rewarding aspiration and self-responsibility.” The concept of Living Change is to support families with housing and employment as a mechanism for encouraging and ensuring children go to school and finish their education. Wunan believes that unless families are supported children will not be supported to attend school and will not have the role models that will move them from school into employment and off welfare. The installation of the DD is consistent with and supports the concept of Living Change and has the potential to become an important part of that program.

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In this community, located ten kilometres out of Halls Creek, there are 17 adults (all in employment) and 12 children all of school age living at the site. There were no health issues reported. The DD unit is located within a shared living space which is air-conditioned. People have access to the DD 24 hours a day and it is clear that because there is such extensive access it is being widely used. There are no other services such as health or schools at the site. Schools, Centrelink office and health facilities are available in Halls Creek 5 km away. Mobile telephone coverage is poor to non-existent, and only the manager at the hostel has a computer.

The DD in this community is heavily used and this is supported by the weekly reports and usage data. The hostel manager was very engaged with the community and has supported the DD since its installation. He and his wife are champions supporting the community in their interactions with the DD making this a very successful installation. They introduced the adults to Internet banking which had not previously been an option and provided advice on safe Internet use. They have also introduced other websites to the adults such as Seek.com. Some of the adults are using Skype for communication through the DD. The women are being encouraged to shop online and have been buying material and cotton for sewing, the manager’s wife at the hostel has been using this to improve literacy.

The hostel manager reported that apart from using the Internet the children were also accessing the content provided with the DD this included reading books and playing games (those provided all have an education focus either supporting numeracy or literacy). He also said that the children were using it extensively for their school work.

The DD has enhanced the education of the children in the hostel through the use they are making of it. The view was expressed that if the DD unit was removed after the trial the people will be quite upset.
**Binjari Top Camp (NT)**

This community is located 20kms from Katherine and is made up of 137 adults (27 are employed) and 101 children, 63 at school. 18 of the adults have health issues and three of the children as well. There is a preschool and a Centrelink agent regularly visits the site. Health services and the local primary school are available approximately 20 km away in Katherine. The DD unit is located in the administration office of the community, this is not ideal as it means the community have access only eight hours a day, five days a week. However no other suitable location was available for the unit. The usage statistics show that because there is such restricted access less use is being made even though this was the largest community where the DD was installed. Mobile Telephone coverage is poor.

Usage at this community is not high, but people at community would love to spend more time using DD unit. They also watch videos on YouTube uploaded by another community and it encourages them to involve in different activities. Prior to the installation of the DD unit, community people had no access to internet in community and also very minimal knowledge of the internet, but the DD trial has changed everything in past 6 months. Children have much more exposure to on online education and adults also keep up to date information such as local news and weather forecast in the area. This site shows the most potential for improvement in terms of the usage of the DD unit.

Visitors from other communities are also using the DD at this site. There is also evidence that children at this location are showing their parents how to interact with the DD and sharing with them the work they doing at school. Clearly this is helping build computer literacy among the adults. Community representatives expressed surprise with the positive impact the DD has had on their community.

As with other communities, use was primarily by those between the ages of 10 and 35 however some of the users in this community were older people.
The community representative believes that this community is not in a position to cover the service and maintenance costs beyond the extended trial period as they do not receive any operational funding from either Federal or Territory Governments and they are struggling to find ways to meet their current expenditure.

**Bana Yarralji Bubu (Shiptons Flat)**

Bana Yarralji Bubu Ranger Base at Shipton’s Flat located near Cooktown in Far North Queensland. This is a small community with just 15 adults (14 employed) and three children all of school age. The health issues noted in the adults are diabetes and asthma. Most services such as school and health facilities are in Cooktown 35 km away. The closest Centrelink office is 250 km away in Mossman.

Usage at this community was also low, but children find that DD unit attractive and they just want keep using it. Children are spending time using the DD unit after school.

Main usage at this community is to process Centrelink requests, educational websites, local news and weather forecasts, they also use the DD for Skype. Children generally operate the DD unit after school, between 4pm to 5pm and adults use DD unit any time between 8am to 5pm. One 8-year-old child said they thought it was the biggest change they had experienced in the community. Some of the users in this community were older people.

The community believes funds are very tight and at this stage there is no provision for DD service and maintenance cost.
Usage data

Usage data was provided regularly by people at each site over the trial period. Baseline research was undertaken by APN during installation of DD unit at all 3 communities and APN also collected further usage and demographic information from their visit to all 3 DD sites in January & February 2013. Table 1 presents the usage data expressed as averages, from the three sites.

<table>
<thead>
<tr>
<th></th>
<th>Burruluba Yura Ngurra, Halls creek (WA)</th>
<th>Binjari Top Camp (NT)</th>
<th>Bana Yarralji Bubu, Shiptons Flat (Qld)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per day used by children</td>
<td>7.5</td>
<td>4.4</td>
<td>3</td>
</tr>
<tr>
<td>Web browsing only by children</td>
<td>90%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Hours per day used by Adults</td>
<td>6.8</td>
<td>4.1</td>
<td>1</td>
</tr>
<tr>
<td>Web browsing only by adults</td>
<td>95%</td>
<td>65%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Not surprisingly, during the Christmas period usage of the DD was quite low otherwise there was consistent usage across the three sites.

The use of the DD in two of the sites (Burruluba Yura Ngurra and Binjari Top Camp) was good (very good for Burruluba Yura Ngurra given that the community is quite small) with the usage data reports indicating that both children and adults were using the DDs for accessing the internet and they were using the content provided. As mentioned it is highly likely more use would have been made at Binjari Top Camp had the community had greater access.

Considering NBN Co satellite service was temporally shared between DD unit and other computers at Burruluba Yura Ngurra and Bana Yarralji Bubu, the usage statistics at these 2 communities also include the data used for their normal computers.

In addition electronic usage data was also collected. YouTube is the most popular of the websites accessed across all three communities. Usage is not confined to entertainment, as YouTube is also being used for educational purposes. Secure sites such as Internet banking and ecommerce sites were also used regularly. Some of the other sites accessed by the users included Google Earth, iTunes, audio or video streaming. Information websites the community are visiting include news, weather updates, Centrelink (and employment sites), social websites, community News, and of course Facebook.
However, there was less usage of off-line applications and other content installed on the DD in all communities. Community people did struggle with the language used in the educational content and preferred to visit online educational websites. It is likely that this is because the content was designed for African users.

Usage Graphs for the 6 Months trial period

The following graphs provide a summary of the type of use being made of the DD during the trial period at each of the three locations. Note only internet usage is reported here, use of software and applications provided with the DDs was not available.

Burraluba Yura Ngurra, Halls creek (WA):

![Usage Graph for Burraluba Yura Ngurra, Halls creek (WA)]
Binjari Top Camp (NT):

Bana Yarralji Bubu, Shiptons Flat (Qld):

Again these highlight that more extensive use was made of the DDs when installed somewhere where communities had continuous access.
The Commonly used protocols listed above are:

**YouTube**  
This is traffic specifically to the YouTube website.

**HTTP, HTTP Browsing & HTTPS**  
These all refer to web traffic using the HTTP transport mechanism. This includes web pages and associated media as well as downloads and any other connection wrapped within HTTP traffic. An example is email, which is all classified as HTTP (or HTTPS).

**Mobile HTTP Browsing**  
iPhones & similar devices, this is not DD traffic.

**HTTP Streaming**  
HTTP Streaming is an HTTP based media streaming communications protocol and it is generally used by Apple software such as, QuickTime and iOS.

**RTMP & Flash media**  
Real Time Media Flow Protocol. RTMP and Flash media are efficient multimedia delivery through both client-server and peer-to-peer models over the internet.

**iTunes**  
iTunes is a digital media player application used for playing and organising digital music and video files.

**BITS**  
Background Intelligent Transfer System. Used primarily by Windows Update.

**SSL**  
Secure Sockets Layer. This is generally used to establish a secure connection with a remote server for the purpose of making a financial payment or transfer. This is not secure web browsing (which uses HTTPS).

**DNS**  
Domain Name System. This is integral to the functioning of the internet, and is a method to translate human readable names (www.activ8me.net.au) to Internet IP Addresses (e.g. 116.250.255.30).

**BitTorrent & P2P**  
These are peer to peer systems used for file transfers (uploads & downloads), generally of music or video content. BitTorrent is a well known one.

**Google Earth**  
Google Earth is a virtual globe, map and geographical information program.
Recommendations

It is clear from this trial that installing robust computer terminals available 24/7 is of major benefit to indigenous communities. People in this trial did access the internet and were able to use it for a range of activities. Many now have better computer skills and a much greater awareness of computer technology as a result of the trial. Children are using it for school and accessing educational materials indicating that a DD can and does support children’s education. It is enhancing their education and giving them skills they would not otherwise have. These are families who would otherwise have no access to technology.

The trial has demonstrated that as is the case in South Africa, the DDs are robust requiring minimum maintenance and support, they do not require any supervision and with a small amount of technical training provided people in the communities can be responsible for the limited technical support needed.

A robust computer terminal of the DD type therefore has significant potential for remote communities. In the case of the Wunan Foundation it offers support for their proposed Living Change program. For others it provides computer access for school children who would otherwise be left behind. Such technology can be used to support language and culture and offers opportunities for locally developed content.

The DD unit has potential to be utilised in a wide variety of remote indigenous communities. Operating as it does from NBN satellite links and with minimal power requirements it can be deployed almost anywhere in Australia. Its rugged nature makes it suitable for deployment in any community, however it is not fully weatherproof and thus requires a degree of shelter from rain. The DD solution, or an improved version of it, would be more suitable for Australian outback conditions than would an internet cafe solution for example.

APN believes that the trial of the three DD units has provided solid “Proof Of Concept”, and that an improved version would provide a considerably improved user experience plus construction more suited to Australian conditions. This could provide a solid basis for any expanded rollout of the DD concept.

The recommendations are divided in three parts.

Current installations

- Support internet access and ongoing maintenance of the existing three installations. Given the value to these communities and the fact that people from the communities
indicated they would be very disappointed if the DDs and internet access were removed.

- Ensure accessibility 24/7 rather than just in business hours. This will require identifying suitable locations.

**Future installations**

- Consider a wider rollout for other remote communities. The DD has the potential to be networked enabling communities to connect to one another through the DD.
- Need for more formalised training for communities on issues around security and internet banking, cyber bullying and children etc.
- As detailed above, a redesigned unit would be more suitable to Australian conditions both physically and in terms of the software and user interface. This would increase options for location of units and would improve its usability considerably.
- Investigate building a similar style of terminal in Australia. The housing is not complex, the screens and keyboards can be imported, the technology is standard. This will mean the terminals are cheaper and would enable more tailoring of the terminals for specific locations taking into account climatic and other environmental factors. This may also provide employment/commercial opportunity for a community.
- An Australianised version should provide a lower total cost and could be an employment/commercial opportunity for a community.

**Changes**

- The DD needs to look more like the computers children will have seen in school or adults in the workplace (elsewhere). Installing Windows as the operating system would assist with this.
- Review the software provided and install applications relevant to and of value to the communities.
- Review the educational software and consult with communities and schools on what should be provided.
- Significant potential to be used for supporting learning language and promoting culture.
- Educational curriculum and teaching assumes that Year 11 and 12 students will have access to computers and the internet. This is not the case in these communities; a DD is an ideal solution.
- Reconfigure network design of DD units, e.g. no client/server model and having each PC operate independently.
- Remove individual user accounts and have the system automatically log in with a generic account. This means there is no concept of user logins and the terminals “boot and go.”
- Install all educational and other content to DD or make it available on cloud.