

BEHIND THE DOT

GEORGIA BEATTIE

From rule-breaker to
Startup Victoria Chief

8 AUSSIE WOMEN IN STEM

Inspiration and advice
from leaders and
stereotype-busters

WOMEN IN STEM SURVEY

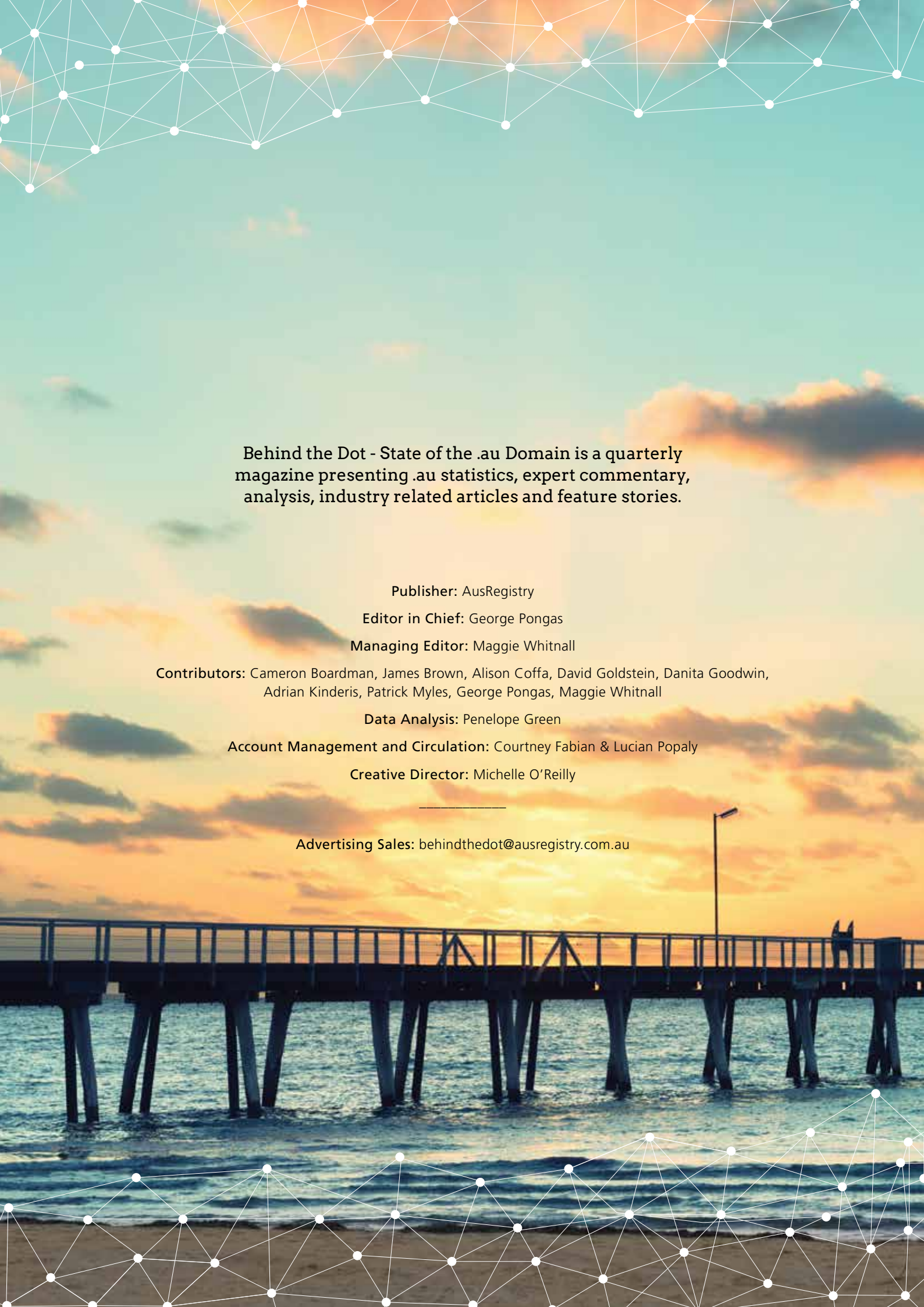
What the industry told us

ANNUAL SURVEY RESULTS ARE IN

Aussies' online behaviour
and domain trends

A NEW LOOK

.au gets a makeover
in its 30th year



Behind the Dot - State of the .au Domain is a quarterly magazine presenting .au statistics, expert commentary, analysis, industry related articles and feature stories.

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3,071,318
.au domain names
currently registered

1st October 2016

Foreword



Welcome to this edition of *Behind the Dot: State of the .au Domain*. This is a 'bumper' edition, containing not only our annual .au survey but also a detailed look at the important theme of women in STEM – a topic of particular importance to AusRegistry as an organisation.

In December 2015, the Australian Computer Society (ACS) found that while participation in the national workforce is around 43 percent, within the ICT profession it is only 28 percent.

With a number of barriers identified for women joining the industry, proactive action is required to overcome obstacles and increase diversity. We at AusRegistry recognise that to succeed, we need to attract the best of the best – regardless of gender or background.

This year we established a Women in Technology working group to address the topic and drive initiatives that encourage greater participation in technology by women and girls. From this edition forward, we'll be including a regular 'Women in Tech' segment in *Behind the Dot* magazine. If you or someone you know would like to contribute, please reach out to us.

Also featured in our magazine this quarter is a conversation with Startup Victoria's new chief executive, Georgia Beattie and a profile of some prominent Australian women working in and around the STEM fields – Science, Technology, Engineering and Mathematics.

In addition to this, we bring you the results of our own women in technology survey conducted around our Girls in ICT breakfast in April.

Our November edition also presents the annual .au survey report. This year's survey continues our ongoing commitment to gaining in-depth insights into the way Australians engage with the Internet and .au to ensure we build programs and systems that best support the Australian Internet community.

There are two other important events worth mentioning this quarter. Firstly, in August auDA announced the appointment of its new CEO, Cameron Boardman. I extend our welcome to Mr Boardman and am confident his extensive experience in policy development and innovation will be a valuable addition to the organisation. We look forward to working with Mr Boardman going forward.

Finally, the domain name industry lost a passionate advocate in recent months with the sad news of the passing of Tony Lentino. Known not only for his work for the domain name industry in founding Instra Corp, but also a vocal supporter of the motor racing community, my thoughts go out to his family and friends.

I am pleased to present this special edition of *Behind the Dot: State of the .au Domain*. As always, we welcome your feedback and input on the magazine and thank you for reading.

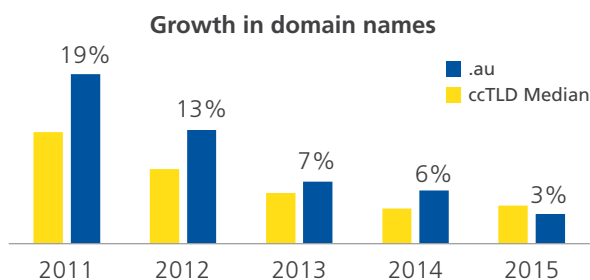
A handwritten signature in black ink that reads "Adrian". The signature is fluid and cursive, with a large initial 'A'.

Adrian Kinderis
CEO, AusRegistry

Under the microscope

By Patrick Myles, NetKnowledge.com.au

The .au namespace grew roughly 3 percent over the 12-month period from June 2015 to June 2016, during which time it pushed through the 3 million domain mark and maintained its position within the top 10 largest ccTLDs globally. Although .au has outperformed average ccTLD rates¹ in previous years (see chart) it has also followed the general trend of a growth slow-down.



In fact, it was as recently as 2011 where average annual growth was double digit. Growth since then for most has more than halved and in 2015 was around 4 percent. At this rate, many ccTLDs who have only ever experienced positive growth will begin to see negative figures in the next couple of years.

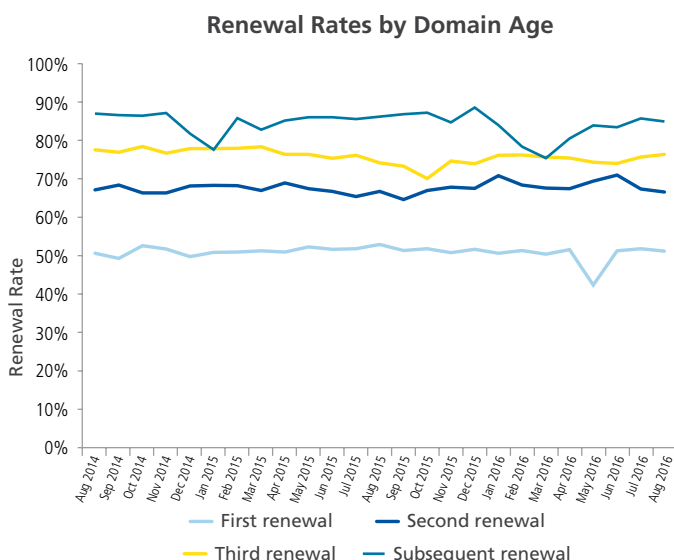
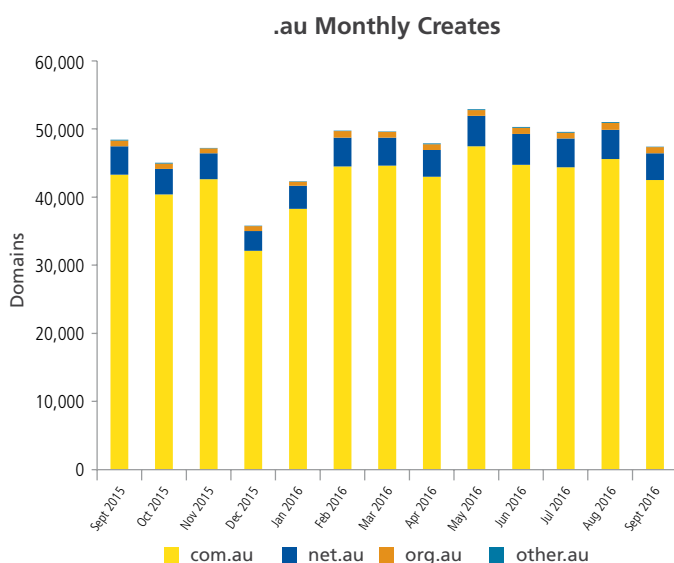
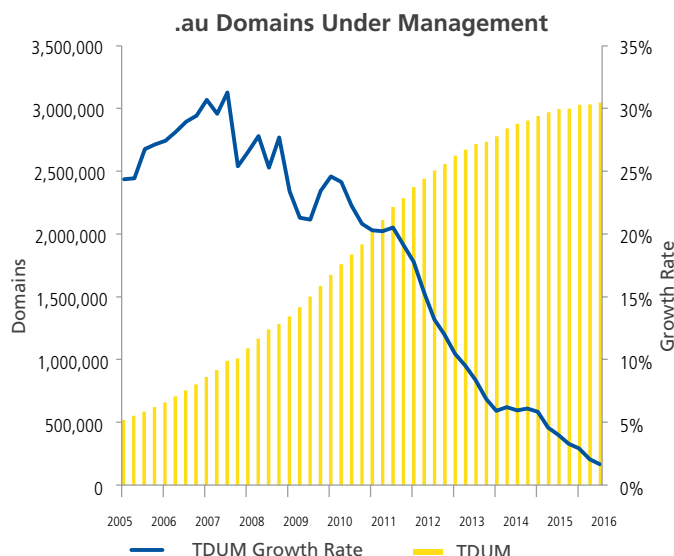
Reason for declines across the industry have been widely discussed. Some consider a general market saturation (not enough demand from new businesses; and/or personal domains never took off in most countries) while others attribute it to the emergence of social media (e.g. Facebook webpages), changing behaviour in search, the departure of domain speculation from the industry and even economic influences. One could also argue that in a very young industry in the 1990s, ccTLD operators may have been complacent in their long term business strategies – hardly surprising given so many of them grew up within technical departments of universities and not-for-profit structures and were unlikely to have been commercially orientated.

Whatever the reason, the growth trend is likely to have an impact to the bottom line of many ccTLD operators. The reliance on domain sales as a source of revenue is often heavy but evolving as operators consolidate their businesses, R&D departments pop up and marketing teams are bolstered. R&D and marketing are particularly important as they may hold answers to revenue diversification, innovation and new markets. Many ccTLDs are already developing new products which begin to produce revenue for the organisation in the hope to steer the reliance on domain sales towards a more sustainable situation.

As to domain sales, although there is market growth decline, the pace of that decline has also slowed, meaning ccTLD sales may flatten to some degree which could drive a shift from customer acquisition to a further development and support of existing customers.

Data Sources: CENTR, Net Knowledge

¹ Average (median) ccTLD growth refers to a basket of 30 ccTLDs from around the world, selected based on a selection of ccTLD comparable in either size (DUM), policies or geographic region.



.au research and surveys

AusRegistry is pleased to present the findings of the fourth annual .au survey. We are thankful for the support of auDA and the Australian digital community for assisting with this continued research into the .au namespace.

Each year we seek to gauge the sentiment of the Australian populace with respects to their interaction with the .au namespace. We evaluate domain-related activity that includes but is not limited to purchasing decisions, holding rates, online behaviour and user expectations.

The information gleaned from the survey is then fed back into the industry by several means of distribution. The report is published in AusRegistry's quarterly magazine, *Behind the Dot* (which is available for download on ausregistry.com.au) with findings shared extensively on social media. Additionally, *Behind the Dot* is sent to a number of industry stakeholders and bodies including .au Registrars and auDA members and supplied to numerous industry events including the auIGF. The complete data set is made available to entities who apply directly to AusRegistry and have legitimate research requirements.

The 2016 findings support previous results as well as presenting shifts in sentiment and domain adoption. The 2016 survey included a number of additional questions, the findings of which will be presented separately within the report.

The gender gap is closing with respect to holding rates with women accounting for 47% of domain holders compared to 44% in 2015 and 43% in 2013

Survey highlights

The 2016 survey findings are presented in the categories of Demographics, Online Behaviour and Communications, Online Presence, Australians and Domains, and Australians and .au Domains.

The findings differ between the various survey respondent groups which are identified as;

- Holders of a domain name and non-holders of a domain name
- Holders of .au domain name and non-holders of a .au domain name

A number of findings are consistent with the results of previous surveys and some have presented new insights which have been further explored in the Survey Findings section.

Some of the highlights include;

Demographics

- Nationally represented in age, gender and state and consistent with 2015

Online behaviour and communications

- Over 80% of respondents used social media
- Use of search and social for content navigation was high, with each option selected by over 50% of respondents. Use of domains remained at 22% (unchanged from 2015)
- 78% of respondents used a free email address (e.g. Gmail, Hotmail)

Online presence

- Over two thirds of respondents would choose a .au domain if setting up a new website
- The proportion of non-domain holding respondents with desire to expand their online presence increased from 13% to 19%
 - » Amongst non-domain holding business owners this jumped from 27% in 2015 to 39% in 2016
- Amongst non-domain holding business owners, those who express 'no need' to hold a domain name dropped from 67% in 2015 to 52% in 2016

Australians and domains

- Domain holding rates have held steady
- Most respondents registered a domain name very early in the process of establishing a business
- People chose non-.au names for a variety of reasons – the slightly more common responses were cost, simpler regulation requirements and to appeal to an international market

Australians and .au domains

- Respondents holding .au reduced from 61% of domain name owners in 2015 to 58% in 2016
- Respondents holding .au only remained steady
- Respondents hold .au mostly because it is 'the most popular choice for Australians'

Note:

A complete set of survey tables summarising all survey results is available upon request.
Please contact behindthedot@ausregistry.com.au

Background

.au has a rich history. It is not surprising that in its 30 years of operation, .au has become one of the most established and successful ccTLDs. As a namespace it not only sits as one

of the most popular of ccTLDs, having ranked in the top ten for registrations under management for a number of years, it is a namespace that continually strives to innovate and to safeguard its users¹.

.au's 30th anniversary was commemorated in edition 8 of AusRegistry's *'Behind the Dot'* magazine, including a detailed overview of .au's three decades of growth and development as well as a section dedicated to the future of the namespace. https://www.ausregistry.com.au/wp-content/uploads/2016/07/BTD_Issue_8.pdf

With respects to innovation, it is worth noting that the auDA Board recently approved the 2015 Names Policy Panel's recommendation to introduce direct registrations in .au – for example, "yourname.au".

The auDA Board agreed that the introduction of direct registrations would:

- make available domain names which are shorter, more appealing and more memorable
- give Australians more choice in deciding what domain name to register
- respond to market demand
- be more attractive to natural individuals than the current option, id.au
- strengthen the ".au brand" in a globally competitive market
- add value to all three main categories of users – Registrars and resellers, registrants and ultimate users of the .au domain name system².

Whilst there is still a way to go with respects to implementation (including further stakeholder consultation and policy development), .au has made an important step towards the future. This change represents a commitment to the Internet community by offering more choice than ever before. Future surveys will seek to assess the impact of direct registrations.

Having a website is now generally seen as a precursor to setting up a business

Methodology

The .au survey was conducted in July 2016. The question set was based on previous surveys with the addition of several questions and covered the major themes of Demographics, Online Behaviour and Communications, Online Presence, Australians and Domains, and Australians and .au Domains.

¹ <http://www.verisign.com/assets/domain-name-report-july2016.pdf>

² <https://www.auda.org.au/news/auda-to-introduce-direct-registrations-in-au/>

With the exception of the first baseline survey in 2013 (which surveyed over 9,000 respondents) the sample size for the subsequent surveys has been approximately 3,000 respondents. This number represents a sample size large enough to gauge the satisfaction levels and behavioural traits of Australian Internet users. Quotas were set that were nationally representative of age, gender and state. For the purposes of the survey the number of domain name holders were monitored to ensure an adequate sample size.

Note:

The change of survey providers and identified impacts which were manageable is outlined in the 2015 survey methodology found here: https://www.ausregistry.com.au/wp-content/uploads/2016/10/BTD_Issue_4.pdf

Set up

In 2015, the survey distribution model previously employed to execute the .au survey changed. Survey responses were no longer acquired via a network of websites linked to the selected profiling company. Instead AusRegistry engaged Research Now, a leading global panel provider and digital data collection company, to deploy the 2015 survey and subsequently the 2016 survey.

Research Now distributed the survey to a panel of respondents by email.

.au remained the primary choice of domain holders at 58%.

Who responded?

The number of completed surveys for 2016 totaled 3,011.

Respondents were selected to be nationally representative of age, gender and state based on ABS census data. Respondents were Australian residents over 15 years of age. (This varied slightly from 2015 when the age range was over 18 years of age).

As with the 2015 survey, completed surveys were monitored to ensure the end sample was nationally representative within acceptable deviations, and de-duplication technology was in place to prevent multiple attempts at the survey by the same person while maintaining data integrity. The data quality was also monitored for;

- Illogical or inconsistent responding – this is monitored and detected by use of logic checks that are programmed into the script.
- Overuse of item non-response (e.g. 'Don't know') – these respondents are captured and removed from the final data during the quality checks.

- Speeding (overly quick survey completion) – responses where the completion time is less than 30% of the median length of the survey are identified across the entire sample. They are removed from the final data.

An incentive was offered to reward respondents for their time and participation.

Survey findings

Over the past four years .au survey data has provided vital information for the management and development of the .au namespace.

A series of questions was asked to discover how Australians engaged online. Several questions were repeated from previous years while others were introduced or edited in light of developments in the online world and research performed by other organisations. Where questions have been repeated in several surveys, comparisons to previous years have been made.

Note:

Language – there are a number of abbreviations and industry terms used throughout this report which are defined in the 'Definitions' section. Importantly the word 'hold' and its derivatives are terms that have been used throughout the report to denote the act of licensing a domain name.

Demographics

3,011 Australian respondents between the ages of 15 and 99 completed the 2016 .au survey. 50.8% of survey respondents were female and 49.2% were male. Slightly more than 20% of respondents were born outside of Australia, with the majority of these coming from the UK and 3.4% from New Zealand.

Online behaviour and communications

Respondents were served questions relating to their online behaviour.

The use of social media by Australians has been relatively stable over the last 12 months, with Facebook remaining the top choice at 69% while Google+ and YouTube are also popular.

26% of respondents had a personal LinkedIn account. This number increased to 36% in the 25-34 age group and dropped to 17% in the 65 and over category. Similarly, 17% of respondents reported using Tumblr, Pinterest or Instagram, however in the under-24 category the number climbed to 46%. In the over 55 age groups, only 4% of respondents used these types of social media.

In the area of 'content navigation' search engines remained the highest at 70% despite dropping slightly from 74% in 2015. Facebook – which was a new response option this year – was also high at 55% of respondents. Respondents using

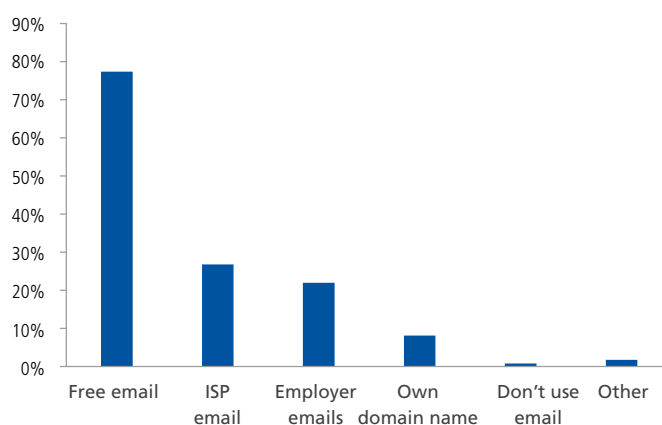
domain names to navigate to content remained steady at 22%; the same as in 2015.

The choice of email accounts was also explored this year. Particularly in professional settings, an email address can be an important signal for recipients. A recent survey in NZ found that only 6% perceived a free email service (e.g. Gmail.com, Hotmail.com etc) to be 'professional' and only 10% saw an ISP-provided email address (e.g. optusnet.com, bigpond.com etc) as professional, contrasted against 75% who perceived a domain-based email as such.³

Given this, there appears to be much scope for Australians to improve their email address for maximum impact. Over 78% used a free email provider and 49% used this as their only email. Only 8% used their own domain-based email, although 22% used an employer email address which might provide similar professional benefits in many situations.

Perhaps most interestingly, 27% used an ISP-provided email and 11% used this as their only email address. Use of ISP email addresses limits mobility of service provider so decisions to use these addresses rather than a more portable domain name or free services may justify further investigation to see if this represents a gap in the market or educational opportunity.

Email type used



Online presence

Of those who do not hold a domain name, the most common reason cited for this was that they had 'No need' (72%). There was a small rise in "Don't know how" and a large increase in "Use alternative" with the latter increasing from 1% in 2015 to 8% in 2016. Amongst business owners, the 'No need' response dropped to 52% from 67% in 2015. Also amongst business owners, 'Use alternative' increased from 1% in 2015 to 9% in 2016.

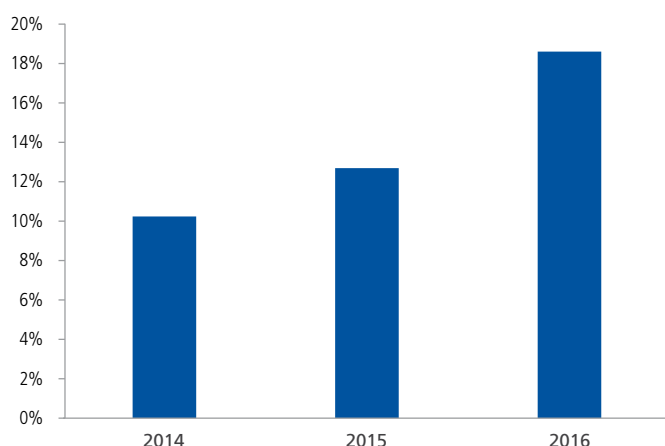
The 'No need' response has been dropping in recent years however and a follow-up question to the 2,323 non-domain holders in the 2016 survey has revealed a steady increase in those without a domain wanting to expand their online

³ <http://www.getyourselfonline.nz/>

presence to 19%. The desire was even stronger among non-domain holders who also own businesses - 39% of this group wanted to expand their online presence.

However, responses indicate that these respondents don't want to expand online presence from a standing start. Of the 476 respondents who do not use social media (defined as Facebook, Twitter, Pinterest, Tumblr, Google+, Instagram, LinkedIn or a blog), and do not have a domain, just 34 (7%) were interested in expanding their online presence. Of the 1,847 respondents who did use social media but did not have a domain, 22% wanted to expand their online presence. In this way social media could be considered a 'gateway' to a broader online presence including a domain name and/or website and this group may include for example businesses operating solely through a Facebook page.

Desire to expand online presence



Australians and domains

Today, business use of online channels to communicate with customers is becoming standard. 48.6%⁴ of businesses have a web presence, 63.4% for businesses with greater than five employees.

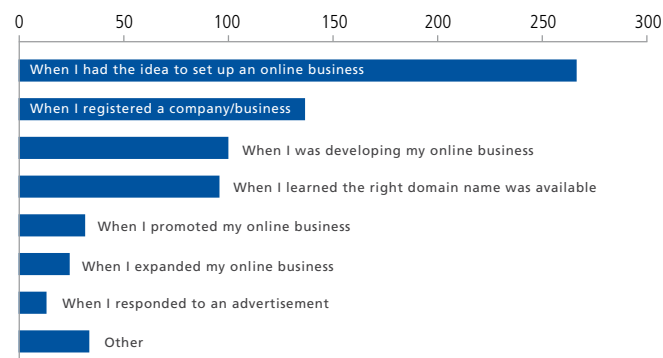
Domain holding amongst respondents has remained steady at 23% in 2016 (against 22% in 2014 and 21% in 2015), indicating a mature and stable market. The gender gap is closing with respect to holding rates with women accounting for 47% of domain holders compared to 44% in 2015 and 43% in 2013. (on a slightly different question construction).

⁴ <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8166.0Main+Features12014-15>

Among business owners, women appeared to have slightly higher domain ownership rates (61% vs 56% for men) but given the smaller samples in this cohort, it is difficult to draw definitive conclusions from these numbers. It is possible that female-run businesses are more likely to be online-based but further research would be needed to support this. In any case, business ownership is unsurprisingly a key driver of domain holdings.

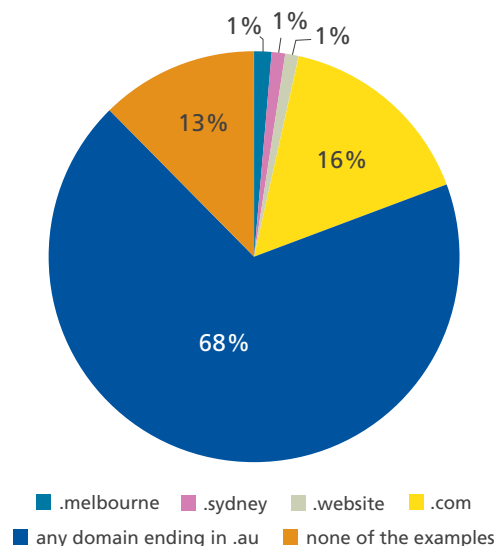
Having a website is now generally seen as a precursor to setting up a business – 72% of respondents who hold a domain name acquired it early in the process of establishing the business. ('Early in the process' includes the responses: 'When I had the idea to set up an online business/personal website/email', 'When I registered a company/business name/trademark', 'When I was developing my online business/personal website').

Domain holders



When thinking about respondents' preference of domain if setting up a new website, there was a strong tendency to establish a local presence – 68% nominated a .au domain option.

Preferred domain option



Australians and .au domains

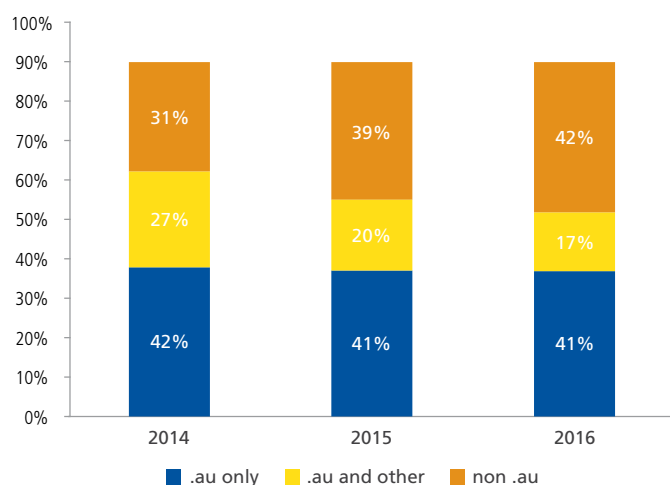
Of the 688 respondents who held a domain name, 58% held .au domain names. This is a reduction on previous years, perhaps as a result of increasing competition in the market from the introduction of new generic Top-Level Domains (gTLDs) or the increasing internationalism of the web. Awareness of new gTLDs remained steady at 26% among domain holders and 14% for general survey respondents.

Note:

Since 2013, over 1,000 new gTLDs have been delegated into the Internet's authoritative database, known as the Root Zone. ICANN have a New Generic Top-Level Domains website that provides an updated list of all delegated new gTLDs. The list can be viewed at <https://newgtlds.icann.org/en/program-status/delegated-strings>

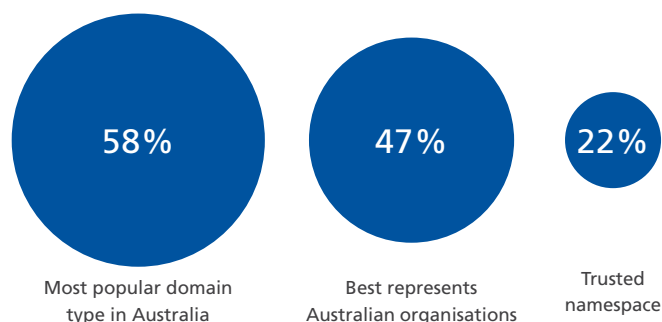
Whilst the number of respondents holding a .au domain has reduced, the percentage holding only .au is very stable – rather the reduction has occurred among those holding a portfolio of different names. Increasingly, .au is not included when constructing a wide portfolio as shown in the Figure below.

Respondent domain holding



Those who choose to hold .au gave every sign of being happy with their choice. The dominant reasons given for selecting .au were that it is perceived as the 'Most popular domain type in Australia' (this response increased from 50% in 2015 to 58% in 2016), it 'Best represents Australian organisations' and is a 'Trusted namespace'. These have consistently been the top selections over three years of surveys (the 2013 question was constructed differently and is not directly comparable) and this pattern represents the ubiquity and strong identity of .au domains for Australians.

Reasons for choosing .au



.au is also considered to be accessible with 85% of the 396 .au domain holders surveyed identifying the process of registering their domain name as either 'Very easy' or 'Somewhat easy'. A further 9% inherited the name they hold and thus held no opinion of the registration process. Just 6% found it 'Difficult' or 'Very difficult'.

The purchase point for a domain name is predominantly focused on the very early stages of setting up a business

Respondents also felt positively about the level of regulation currently applied to the .au domain name market. Although a high percentage (25% for those holding a domain and 57% for those not holding a domain) didn't know or had no opinion on regulation, the remaining responses were fairly balanced. Those holding just one zone – whether .au or something else – were much less likely to have an opinion than those holding a combination. For those holding a combination of .au and other zones, more than 85% expressed a view on the subject.

Of those who expressed an opinion on this question, 60% of total respondents and 71% of domain holders specifically felt that overall, the current rules provided 'About the right amount' of regulation. The remainder tended to categorise the space as having too little regulation though a small selection consider there to be too much.

Conclusions

The conclusions provided in this report are drawn from the 2016 survey results. The recommendations come directly from the conclusions presented.

.au domains

People chose to register a .au domain name because it is the most popular domain type in Australia and best represents Australian organisations.

.au remained the primary choice of domain holders at 58%. This number has decreased from 61% in 2015 and 69% in 2014. The decline is mostly attributed to less people holding .au domains as part of a portfolio.

.au domains are mostly used for a business website and email.

Most respondents indicated that the amount of regulation for .au is about right and believed it's easy to register a .au domain name.

Over two-thirds of respondents would register a .au domain if setting up a new website.

Over two-thirds of respondents would register a .au domain if setting up a new website

Domain name holding

Overall domain ownership rates have held steady at 23% in 2016.

The purchase point for a domain name is predominantly focused on the very early stages of setting up a business – when the business idea occurs or during development/business registration.

Holding .au as part of a portfolio of domain names has declined. While 41% of domain holders register .au alone (42% in 2014 and 41% in 2015), those holding .au and non-.au concurrently dropped to 17% (down from 27% in 2015 and 20% in 2014). Holding non-.au only has risen to 42%.

Non-domain holding

72% of respondents without domain names mostly said they have 'No need' which has dropped from 2015 (84%).

The proportion of respondents who desire to expand their online presence has increased from 13% to 19%. Amongst non-domain holding business owners this jumped from 27% in 2015 and to 39% in 2016.

People chose non-.au names for a variety of reasons – the more common responses referred to cost and appealing to an international market.

Online behaviour and communication

Social media use remained high and was consistent with previous years.

Content navigation through domains was low at 22% whilst search and social media (Facebook) were high at 70% and 55% respectively.

78% of respondents used a free email service and 27% used an email address supplied by their ISP.

Recommendations

Continue to survey Australian population

Conducting regular surveys in order to understand the utilisation of the .au namespace and the satisfaction levels of its users is an important feedback channel for the .au domain name industry. Significant insights are gleaned and trends identified, all of which can be used to influence and guide decision making in the areas of .au marketing and education, governance and technical operations.

Monitor email choice

'What email address do you use?' was a new question introduced to the survey in 2016. The findings show that the majority of respondents use a free email address and many utilize an email address from their ISP. Given that the findings from a .nz survey⁵ found that only 6% of respondents think a free email is professional and only 10% think so for an ISP email it may be prudent to investigate why use of these types of email was so high compared to only 8% who used their own domain name for email.

Investigate the shift in those that wish to increase online presence

There was an increase in respondents wishing to expand their online presence from 13% to 19%. Among non-domain holding business owners that jumped from 27% in 2015 to 39% in 2016. Additionally, there was a reduction in respondents who claimed they had 'no need' for a domain name – from 84% in 2015 to 72% in 2016. This identified a large group of people who may benefit from further online education.

Survey findings showed that respondents holding .au and non-.au concurrently dropped to 17% (down from 27% in 2014) and respondents holding non-.au only has risen to 42.4%. Future survey findings are required to determine whether this is attributed to increased competition in the market.

⁵ <http://www.getyourselfonline.nz/>

8

Aussie women in STEM

Australian women are thriving in the world of STEM (Science, Technology, Engineering and Mathematics) and combating stereotypes about what it means to work in these industries. Behind the Dot was privileged to speak with eight exceptional women, making significant contributions to their various fields of expertise.



PROFESSOR MARY O'KANE AC
Chief Scientist & Engineer,
NSW Government



How did your parents encourage your interests?

My father was a school principal and my mother was an accountant and both really encouraged my love of maths and science from a young age. We would sit around the dinner table solving maths problems, and I was always conducting science experiments and entering competitions.

What are some of your most significant achievements?

Creating the phrase "early career researcher" was probably my biggest achievement. It's now translated into many languages & used across the world as a concept.

I was very honoured this year to be appointed a Companion of the Order of Australia "for eminent service to science and engineering, as a contributor to national policy development and governance, to the promotion of technology research and future energy supply, to higher education, and as a role model for young scientists."

What can the industry do to support greater diversity?

Really concentrate on getting women into the fields of ICT, engineering and other science-based professions. Just as in developing countries the best thing you can do (after providing clean water etc) is to educate women, so in Australia, a developed country, getting women into these fields in large numbers should lead to a massive transformation in our attitude to these fields.

chiefscientist.nsw.gov.au



ALLY WATSON
Developer; Founder,
Code Like a Girl



What attracted you to the ICT sector?

I am drawn by the marriage of creativity and technology. Shortly after graduating in Computer Science I began a career in website development. I love this line of work because I get to work alongside graphic and user experience designers on really exciting and creative projects.

What's your favourite career highlight?

The achievements I've made through the initiative I started, Code Like a Girl. We have just been awarded a Tech Diversity award in the Education sector for our work this year in Melbourne and our efforts to improve gender diversity in tech.

Name one challenge of working in ICT

Finding the right boss and team can be quite a challenge. It's a fast moving industry and you'll want to grow with it. Having the right management team to support and nurture you through that growth can make such a huge impact on the developer you will become.

Advice for young women considering careers in ICT

Coding is first and foremost about problem solving and the journey to success is littered with error messages. Embrace the error message! In the context of coding and tech we need to teach girls to be fearless and embrace failure. Fail fast and fail often.

@codelikeagirlau



LEONIE WALSH

Former Lead Scientist,
Victorian Government & Ambassador
for Women in STEMM Australia



What attracted you to science?

As long as I can remember I seemed to have an excessive dose of curiosity. This curiosity seemed to be focused more around how and why things work and function. This curiosity was also nurtured and supported throughout my education with excellent maths and science teachers.

What's your favourite career highlight?

The negotiation of the manufacturing contract for the scale up of a "new to world" elastic fibre technology at an unused fibre manufacturing plant in Taiwan. The experience reinforced some very important points that have helped throughout my career.

Name one challenge of working in science

One of the challenges that many scientists face is securing funding for their work. As a team leader your success at securing funds can mean increasing or cutting back employment of your team and will also impact the value you are able to deliver to the organisation.

Advice for young women considering careers in STEM

You will have a much better chance of being successful in your career if you always try to put yourself in an environment where you can be stretched to your full potential, enjoy what you are doing and be supported as an individual, valued team member and/or leader.

@kw_sci



SHARON JONNALAGADDA

Business Analyst, AusRegistry



What attracted you to the ICT sector?

I programmed in 'C' for the first time while I was in high school and I fell in love with programming. Coding felt natural to me and I knew I wanted to work with computer systems.

What's your favourite career highlight?

Working as a developer on Domain Name Registry software is my favourite career highlight so far. It's a privilege to work on something from its inception to completion especially a product that will change the future of the Internet.

Name one challenge of working in ICT

I programmed in 'C' for the first time while I was in high school and I fell in love with programming. Coding felt natural to me. The ability to program a computer to perform in the way we want and the speed with which a computer can solve a problem felt very exciting to me. With computers becoming one of the most ubiquitous systems of our time the number of problems that can be solved by mastering computer science seemed boundless to me.

Advice for young women entering ICT

My advice is to get qualified! ICT is exciting and rewarding. There are many path-breaking projects which have global impact. Plenty of diverse specialisations and opportunities exist in ICT, and possessing the right skills can provide a very satisfying and challenging career.

@ausregistry_au



MICHELLE MELBOURNE

Co-Founder, Intelledox



What attracted you to the ICT sector?

In 1992, during my time as a technology consultant, I observed customers struggling with basic business processes. I saw the potential to help customers to use the latest technology to automate these processes. Over 130 happy customers later, I'm still here and I'm loving it!

What's your favourite career highlight?

There are so many, it's hard to point out one. Winning the Telstra & ACT Govt. Young Businesswoman of the Year Award in 2000 was quite special. More recently, signing a global technology partnership with an ASX100 firm that took two years to materialise was extremely satisfying.

Name one challenge of working in ICT

We believe that technology should not be complex or expensive and that transformational results can be achieved quickly. Sometimes entrenched fiefdoms don't like this.

Advice for young women entering ICT

It's a fantastic career path that offers a great mix of creativity and challenges. Definitely look up to ICT role models that you identify with. Read up on current technology content to stay up to date with the rapid changes in trends – it's a "blink and you'll miss it" industry.

@ChelleMelbourne



MAGGIE WHITNALL

Senior Client Services Manager,
AusRegistry



What attracted you to the ICT sector?

I joined AusRegistry as Communications Manager prior to the significant changes to the .au namespace in 2002. I was immediately drawn to the innovative, dynamic and creative environment. ICT attracts passionate, future-minded people which is why I've remained in the industry.

What's your favourite career highlight?

Two spring to mind; introducing and implementing AusRegistry's software and operational processes to countries outside Australia and forming a Women in Tech group dedicated to building an inclusive work environment and promoting ICT to the community particularly young girls.

Name one challenge of working in ICT

I don't have a technical background so it has always been imperative to learn as much as I can about our technology and the environment in which it operates. As a communicator it's essential to know what you're talking about especially when the subject is complex.

Advice for young women considering ICT

There is ample opportunity in a range of professions that require ICT skills. Start early at school and don't assume it's not for you, especially if you're a girl! A foundation in ICT can lead you anywhere especially as technology becomes ubiquitous in our lives.

@MaggieWhitnall



TERESA CORBIN

CEO, Australian Communications
Consumer Action Network (ACCAN)



What attracted you to the ICT sector?

I believe strongly that everyone should have equal access to communications services because being connected is a great enabler. It has been clear for some time that there is a digital divide and end-users need to have a say in the future of communications.

What's your favourite career highlight?

Leading ACCAN for the past six years has been a career highlight. During that time we have secured many wins for consumers including free calls to 1800 numbers from mobiles and better consumer protection regarding usage alerts and improvements in advertising.

Name one challenge of working in ICT

It can be challenging to work with the ICT industry and telecommunications companies to ensure that the consumer concerns are heard and addressed. Regardless, it has been vitally important to highlight how we can contribute to better outcomes for both supply and demand sides.

Advice for young women considering ICT

The best advice if you are passionate and committed to a career in ICT is that you should just jump right in and get involved. There is no question that we need more women in the ICT industry so there are and will continue to be plenty of opportunities.

@accan_ceo



GUNELA ASTBRINK

Principal, GSA InfoComm



What attracted you to the ICT sector?

I was an early adopter, developing training courses in Internet usage back in the 1990s. As a woman with a disability, I knew that ICT hardware and software including accessible websites, could make a real difference to people's lives.

What's your favourite career highlight?

After having advocated and researched the value for people with a disability of accessibility in ICT public procurement for nearly 15 years, I'm excited this is leading Standards Australia, with support from government, consumers and industry, to adopt a Standard for Australia.

Name one challenge of working in ICT

Learning to bridge the gulf between people in technical, management and policy areas (all important parts of ICT) is challenging. Believe in your talents and earn respect by communicating in a clear and concise manner backed up by solid facts. Try to speak their 'language'.

Advice for young women entering ICT

Identify your interests and find a way to combine them with ICT. Follow your passion and work will be more of a pleasure. Make a positive contribution to the community by developing socially useful applications. In ICT, there are boundless opportunities to fulfill your ambitions.

gsa.com.au



#TechDiversity Awards

By George Pongas
Senior Director of Product Management at AusRegistry



#TechDiversity Gala Dinner



The Hon. Philip Dalidakis, MP



The team at Vic ICT for Women



Women in Technology Dinner 2015

The City of Melbourne, National Australia Bank and University of Melbourne were among an inspiring group of organisations recognised earlier this year in the inaugural #TechDiversity Awards.

The awards were presented by Minister for Small Business, Innovation and Trade The Hon Philip Dalidakis MLC at a gala dinner at Melbourne Town Hall in August.

Recipients represent organisations and programs that demonstrate excellence in gender and cultural diversity. Winners included corporate initiatives such as those at software designer ThoughtWorks Australia, and educational programs such as Code Like a Girl, which runs a series of tech-focused events and workshops around Melbourne focused on increasing the number of females in technology.

(You can read more from Code Like a Girl founder Ally Watson in our '8 Aussie Women in STEM' feature, page 13 of this edition of Behind the Dot.)

The #TechDiversity Awards, which launched in 2015, aim to showcase the successful initiatives being implemented by organisations across the sector to demonstrate how other technology companies can achieve greater innovation, growth and competitiveness through gender and cultural diversity programs.

Mr Dalidakis highlighted the importance of the event in shining a light on the positive impact of diversity as well as celebrating those who are leading the way in these fields.

"Victoria's tech industry is leading the country in attracting major global tech leaders to base here and generating revenues of more than \$34 million annually for the economy but there is no doubt, we need more diversity – it is what will make our industry great."

"Congratulations to all who have supported this amazing event over the past two years. The quality of the shortlists, let alone the winners, prove that gender and culturally diverse teams really do give you the best chance of being great."

The #TechDiversity community is spearheaded by a committee representing 13 industry groups and businesses, forming an industry alliance committed to "amplifying diversity awareness and achieving a culture of inclusion, through conversation, collaboration and action".

More information on #TechDiversity as well as a full list of winners is available on the #TechDiversity Awards website at www.techdiversityawards.com. Any questions can be directed to Deirdre Diamante at deirdre@miaconsulting.com.au.

INNOVATION THROUGH RULE-BREAKING

Startup Victoria Chief, Georgia Beattie



Georgia Beattie on why we need entrepreneurs and what it takes to be one.



By **Danita Goodwin**
Communications Manager, AusRegistry

Naughty might not be the first word that comes to mind when you think of a CEO.

But it is exactly the trait that entrepreneur, businesswoman and new Startup Victoria Chief Georgia Beattie says gives her an edge.

The self-confessed 'naughty' one at school, Ms Beattie admits to spending a bit of time in the principal's office during her time at St Catherine's in Melbourne's south-east.

Thankfully, Ms Beattie channeled this quality into pursuing her dream of being an entrepreneur, which has put her on lists like Top 50 Emerging Leaders in 2015 and BRW's Top Start-Ups to Watch in 2012.

"Sometimes it's the naughty ones who will go outside the box and do something that's meaningful, because they're the ones that create those really fundamental changes in an economy or an industry," she says.

Ms Beattie was just 23 when she launched her own business, which specialised in creating single-serve wines in plastic glasses suitable for the outdoors. Officially starting production in 2012, it reached a turnover of \$1 million in its first year.

"I was always pushing something to its limits and wine was missing out on a market because it was so traditional and risk-averse," she says.

"Entrepreneurship is a really important thing for a society, because we need those naughty ones to go and do those things a risk-averse person wouldn't do."

Entrepreneurship is in Georgia Beattie's blood, with the passion and pride that comes from building a business passed down by her business-owner parents. Ms Beattie was born to be her own boss.

"I had good role models around me, in both of my parents," Ms Beattie says.

"We were always taught to have a look at what impacts we would be making in the world."

As CEO of Startup Victoria, one of the largest entrepreneurship groups in Australia, Ms Beattie has taken on the task of helping guide others to greatness.

She says her focus is all about bringing a fresh set of eyes and establishing Startup Victoria as the go-to body for startups.

"A rising tide lifts all boats and it's my job to lift and support the growth of our ecosystem to create more founders and smarter founders."

“You are investing in your future when you learn how to run a business. Entrepreneurship is a no-brainer for women.”

“A rising tide lifts all boats and it's my job to lift and support the growth of our ecosystem to create more founders and smarter founders.”

To achieve that, Ms Beattie says it's all about collaboration.

“Our biggest challenge is collaboration, because that's what we've historically been bad at.

“We have a relatively small entrepreneurial community that we need to work together to grow and we've got serious economic challenges we need to resolve. I believe our entrepreneurs are up for the task.

“We need to throw [ideas] out there and snowball our eco-system.

“I've got a bit of a no bullshit tolerance when it comes to parties unwilling to collaborate.

“The future of innovation is collaboration and we need to shift our mindsets this way.”

She says working together is also the key to encouraging more women into entrepreneurship.

“You are investing in your future when you learn how to run a business. Entrepreneurship is a no-brainer for women.

“Surround yourself with good, supportive people – and they should be a combination of female and male leaders.

“From my experience in manufacturing and wine, where there are so few women in leadership roles, I found women bring a different and critical skill set to the table every time.

“We really need to be playing to our strengths, and they're not masculine, blazer-wearing strengths. They're emotional intelligence, forward planning and all those things that are on top of our natural skill set. We need to bring that skill set and we need to be present in all industries so we have got that balance.

“I really feel for young entrepreneurs. It's not even worth thinking about [the gender gap], there's enough to worry about! So just get out there and start. More than just talking: make a prototype and throw it into our community. Come along to one of our pitch nights which are the last Tuesday of every month. You've just got to get it going, write a plan down and put it in front of as many people as possible for help.”

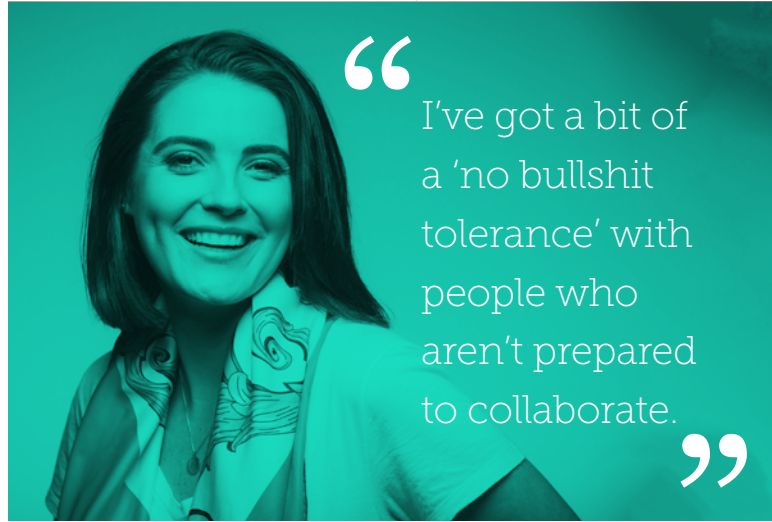
Ms Beattie admits that while she made some rookie errors in the early days, underestimating the value of technology wasn't one of them, instead using it to maximum benefit.

“Regardless of the service or product you are selling, you still need to be able to get to market,” she says.

“This is where programs like MYOB come into play. If the accounting can be done seamlessly, which is a fundamental with a business, then that's going to be really helpful, as well

as the ease of creating websites for communication - these are just the really simple pillars.

“It just doesn't matter what you're doing - I had a production line and I knew exactly what units were going into it and what the wastage was. I had a video set up, I could see the lab results online, so we had this efficiency.



“I've got a bit of a 'no bullshit tolerance' with people who aren't prepared to collaborate.”

“When you can create these gates with technology that allow for communication for everyone to act like a little business owner and to make their own decisions then they can be entrepreneurial and say 'hey, I can do this more efficiently'.”

The big focus for Startup Victoria is the roll-out of an online platform, combining technology and collaboration to provide a go-to resource for fledgling entrepreneurs.

Ms Beattie explains that the idea of the platform is about transparency in the industry.

“So you know who specialises in what and where the kick-arse groups and meetups are. You know where to get help and you know where to grow and learn,” she says.

“We're also introducing a legal and accounting partner so you can get half an hour free accounting advice or legal advice.

“So you can ask a lawyer 'What sort of patents would make my business more competitive?' And I want people to have access to that at a very early stage, because I learnt about legal structures and patents too far down the track and it's something I should have been thinking about at the inception of my business.

“This is what this job to me is all about. It's about me using my own experience to help people create a faster, smarter business.”

Startup Victoria is a nonprofit organisation dedicated to building and supporting Victoria's startup ecosystem. It is Australia's largest startup membership with over 13,000 members. It has a dedicated Female Founders Committee to empower female entrepreneurs, and with a membership base of almost 5,000 members, it is one of the largest entrepreneurship groups in Australia.



Women in STEM survey: what the industry said

By Alison Coffa

Marketing Communications Coordinator, AusRegistry



In the lead up to our Girls in ICT Day breakfast in April 2016, AusRegistry conducted a survey to gain insights into themes surrounding women in technology, barriers to women entering these fields and actions that can be taken to address the issues. The survey was completed by women from a variety of industries and sectors including technology, business, innovation and startups, legal, education and government.

The survey was designed to gather input from this group in order to inform actions and initiatives that can be undertaken by AusRegistry to contribute to positive change in this field and encourage greater diversity in STEM fields (Science, Technology, Engineering, Mathematics).

Most questions required open-ended responses, so a summary of some of the key themes and common answers has been provided below.

Question 1:

What is one of the best aspects of working in a technology role or the technology industry?

The challenges and excitement of a constantly changing industry was a common benefit mentioned by respondents. Many reported enjoying that "no two days are the same" and "being in a dynamic environment on the cutting edge of technology". The ability to make a contribution to the future, work with highly-knowledgeable and innovative people, and the scope for growth and development were also pointed to as benefits of STEM careers.

Many respondents described the dynamism of the technology industry and opportunities to learn and grow as some of its greatest benefits.

Question 2:

What is one characteristic or quality that prepares you well for a career in the technology industry?

There were many varying answers given to this question, however adaptability, flexibility and agility were a clear theme among responses. Respondents also highlighted the importance of fearlessness and having a thick skin, potentially a result of some of the challenges that can be common in this field. In addition to this, survey responses referred to a number of traits related to attitude and thought processes such as open-mindedness, ability to comprehend complex issues, curiosity and a willingness to learn.

Adaptability, fearlessness and open-mindedness were some of the traits suggested as being beneficial for a career in STEM fields.

Question 3:

In what ways could the technology industry benefit from greater gender diversity?

The most common theme among respondents to this question related to the innate benefits that come from including more voices and opinions and widening the pool of ideas available to an organisation. In particular, responses highlighted the importance of representing the whole population rather than limiting ideas to one demographic, highlighting both the social and economic benefits of this for businesses. The other key theme was the improved social environment created by diversifying workplaces. Responses included "diversity in work methods, culture and viewpoints", "represent the women that buy tech products", "more balanced approach to decision-making" and "more women in leadership to drive better work cultures".

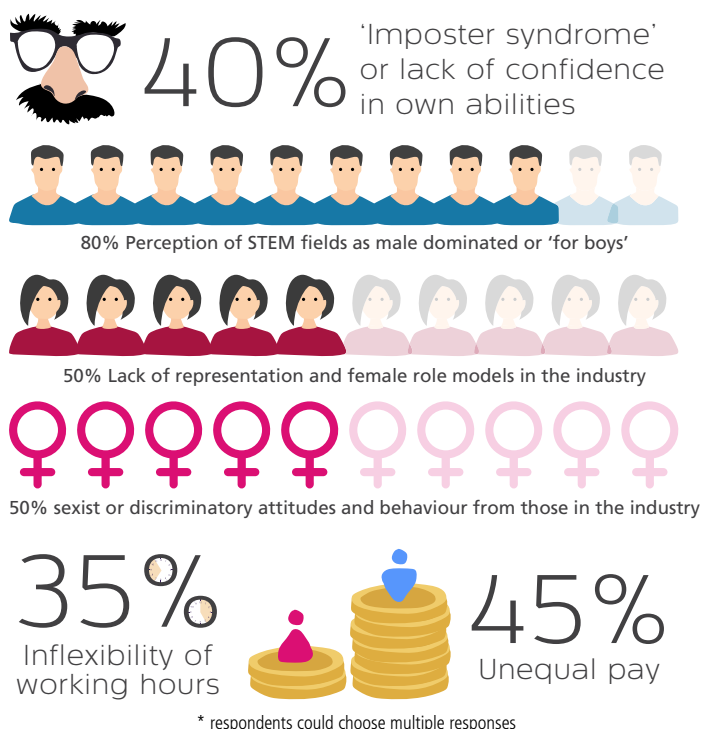
Respondents highlighted various social and economic benefits to businesses in increasing gender diversity.

Question 4:

What do you see as the greatest barrier(s) to girls' and women's participation in technology studies and careers?

Respondents could choose multiple options from this multiple-choice question, or submit additional answers. Overwhelmingly, "perception of STEM fields as male-dominated or 'for boys'" was the most commonly-selected response. Behind this, many of the other popular responses related to the treatment of women in these fields such as the experience of sexist behaviour or unequal pay. Having examples to look to for personal motivation also seems to be of concern to respondents, including a lack of representation and female role models or lack of encouragement from teachers and educators.

Greatest barriers to women in STEM



Question 5:

What is one thing the technology industry could do to support greater diversity?

Mirroring the concern that there is a lack of female role models in the industry, many of the responses to this question related to encouraging women in technology to become mentors and act as role models to younger women and girls. Some respondents also called on male members of the

industries to be allies in this cause and advocate for diversity in any avenue possible. In addition to the importance of role models, many responses related to policy and cultural changes that businesses can make to encourage greater female participation, such as improving pay equity, maternity leave and flexible work arrangements; implementing hiring quotas; and addressing systemic cultural issues such as "the bro mentality" or "boys' club" attitudes.

A strong focus of the Girls in ICT Day event was the importance of industry providing support to the education sector in encouraging girls into STEM fields from an early age, and this was also reflected in survey responses. Many respondents made comments related to building ICT programs and initiatives for girls, getting the tech industry involved at a school level and providing mentoring opportunities, designed to "win them young".

Many respondents highlighted the importance of policy and cultural changes businesses can make, ways the industry can support the education sector and encouraging successful women to become role models and mentors.

Question 6:

An authoritative survey of over 10,000 people conducted in 2013 indicated that of the domain holders in Australia only 30% were held by women. AusRegistry questions whether this indicates fewer women having online businesses supported by an online domain name. What is one thing that could be done to address this disparity?

This was a complex question which raised further points in relation to female business ownership in Australia and the importance of promoting business skills among women and girls. Respondents suggested programs that support women opening businesses, educating teenagers about entrepreneurship or teaching young women how to build websites through seminars or even a competition. There was also a strong emphasis on conducting targeted marketing of .au that focuses on a female audience, while some respondents questioned whether further research could provide more insight in terms of business ownership versus domain ownership or breaking the results down to look closer at sole traders.

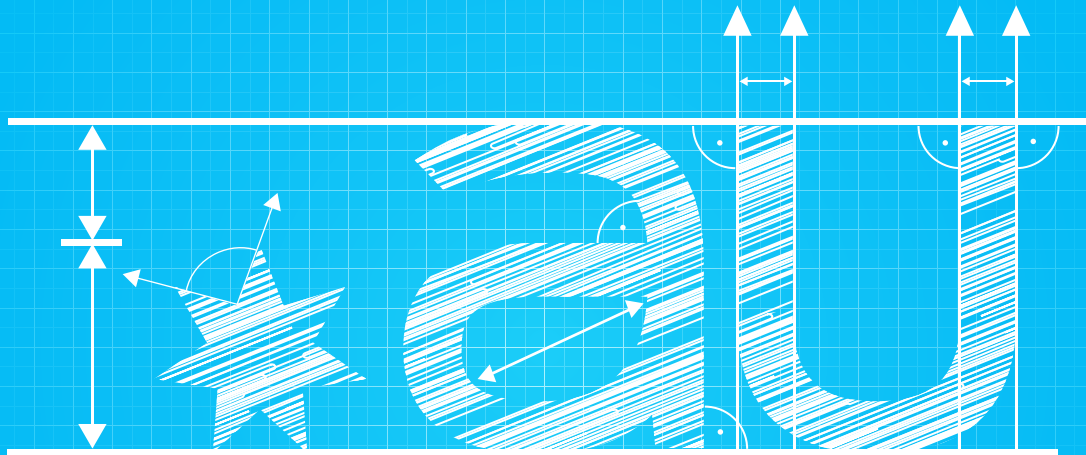
Encouraging business and entrepreneurial skills in young women and teaching women and girls how to build websites were some of the key suggestions for increasing domain ownership among Australian women.

For more information on this survey or to receive a copy of the full report, please contact behindthedot@ausregistry.com.au.



A new look for .au

By James Brown
Marketing Manager, AusRegistry



Making the symbol

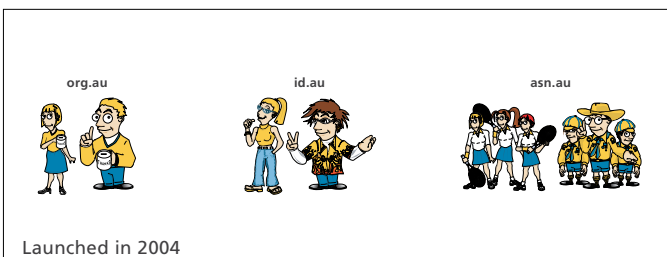
com★au net★au org★au asn★au id★au

New .au logos launched in 2016

Evolution of the second level .au logos



Launched in 2002



Launched in 2004



Launched in 2010

This year .au celebrates its 30th birthday, so as we look forward: to plan for the years to come and future proof this valuable digital asset we thought it is the perfect time to for a makeover. We want to best reflect the trust, brand loyalty, maturity and recognition .au has built over time, and graphically represent this with one new and modern yet immediately recognisable, sleek brand.

We're proud to introduce the 'new look' .au branding.

How did we come up with the new look?

The new .au second level logos include the seven-pointed star in place of the 'dot'. The star is reminiscent of that on the Australian flag, and using it for the .au logo reinforces a sense of inclusion and the fact that .au is a namespace for all of Australia. Including this call back to our flag also strengthens the sense of national pride and a connection with this to .au. We like to think our new logos represent "Made in Australia" online, both for Australians and to the rest of the world.

It's important to remember that while .au has a new look, the ongoing security and stability of the .au domain namespace has not changed. Rather .au's public face is now more reflective of the mature brand it has become over the last 30 years.

Read more about .au's 30th birthday celebrations at 30years.com.au.

DNS & security

Reflection attacks prey on vulnerabilities, but well-configured networks work to defeat attackers

By David Goldstein

The quest for a safe and secure Internet is never-ending, as criminals seek new and ever more complex ways to breach Internet security. For most users, the behind-the-scenes attacks and efforts to prevent them are never seen.

Attacks on business, where the most damage can be done, cause major problems through reputation damage, lost business and time taken to rectify damage. According to Neustar over three-quarters (77%) of organisations in the Asia Pacific suffered a Distributed Denial of Service (DDoS) attack in 2015 and three-quarters (76%) of these were only notified of their attacks by customers and other third parties. Almost two-thirds (63%) of those attacked reported intellectual property, financial and/or customer data theft. For those attacked, at least in Europe, the Middle East and Africa, 82% of attacked companies suffered more than one attack and 45% were hit six times or more¹.

These attacks will often use the "Domain Name System (DNS) server resources to overwhelm targets using techniques including flooding, amplification and reflection,"² and these DDoS attacks are increasing in volume markedly. From the first quarter of 2015 to the first quarter of 2016, globally there was a 125% increase in total DDoS attacks, according to Akamai.³

The size of attacks is growing. In the first quarter of 2016 there was a record 19 DDoS attacks that exceeded 100 Gbps, the largest hitting the software and technology, gaming and media and entertainment sectors the Akamai report stated. This is a significant increase from the five DDoS attacks that registered more than 100 Gbps in the previous quarter, the eight in the third quarter of 2015 and 17 in the third quarter of 2014 — the previous record. Additionally, over 90% of attacks last less than an hour according to Arbor Networks.

Attacks are made even more dangerous because they use multiple vectors, including DNS reflection. Akamai was involved in mitigating one large DDoS attack earlier this year against a European media organisation that peaked at 363 Gbps and 57 million packets per second that used six different techniques, or vectors, including DNS reflection. In this particular attack, "attackers abused DNSSEC-enabled domains in order to generate larger responses."⁴

So what are reflection attacks? According to CloudFlare, "a reflection attack works when an attacker can send a packet with a forged source IP address. The attacker sends

a packet apparently from the intended victim to a server on the Internet that will reply immediately. Because the source IP address is forged, the remote Internet server replies and sends data to the victim."⁵

"That has two effects: the actual source of the attack is hidden and is very hard to trace, and, if many Internet servers are used, an attack can consist of an overwhelming number of packets hitting a victim from all over the world." These reflection attacks become more powerful and dangerous when amplified.

In the attack against the European media organisation, the "use of queries for domain names configured for Domain Name System Security Extension (DNSSEC) only adds to the amplification factor, as DNSSEC responses are even larger than regular ones. That's because they have additional data used for the cryptographic verification."

In Australia there are several bodies that deal with Internet security issues, including reflection attacks. One is the Australian Communications and Media Authority's (ACMA) Australian Internet Security Initiative (AISI) whose focus is on end users.

The AISI helps Internet Service Providers (ISPs) to identify computing devices on their networks that are 'compromised' by malware (malicious software) or with specified service vulnerabilities, including many associated with reflection attacks. Daily reports are provided to ISPs through the AISI that enable them to identify customers on their network with malware⁶ or vulnerable service⁷ types. ISPs can use this information to alert their customers to the need to remove the malware infection or address the vulnerability so they do not unwittingly participate in DDoS amplification attacks or other activities causing harm to internet users.

The other body working to prevent reflection attacks, among other forms of attacks, is CERT Australia. CERT works with major Australian businesses with connections to the Internet such as Internet Service providers (ISPs), telecommunications providers and large companies that manage their own Internet connections, focussing on server-based infrastructure.

CERT alerts companies where there are vulnerabilities within Australia that could lead to, or have led to, attacks such as reflection attacks through vulnerabilities from misconfigured devices.

Regarding a DDoS attack such as a reflection attack where traffic originates within Australia, CERT works to discover where the traffic is coming from, which is most often a service that has been inadvertently exposed or misconfigured. CERT will then reach out to the affected organisations to get the

¹ Neustar DDoS Attacks and Protection Report April 2016

² Neustar Security Operations Center Report April 2016

³ Akamai's [state of the internet] / security Q1 2016 report

⁴ Attackers launch multi-vector DDoS attacks that use DNSSEC amplification [IDG] 19 July 2016 <http://www.computerworld.com.au/article/603676/attackers-launch-multi-vector-ddos-attacks-use-dnssec-amplification/>

⁵ Understanding and mitigating NTP-based DDoS attacks, CloudFlare January 2014 <https://blog.cloudflare.com/understanding-and-mitigating-ntp-based-ddos-attacks/>

⁶ AISI malware statistics <http://acma.gov.au/Industry/Internet/e-Security/Australian-Internet-Security-Initiative/aisi-malware-statistics-1>

⁷ AISI Vulnerable Services statistics <http://acma.gov.au/theACMA/aisi-vulnerable-services-statistics>



problem resolved if the traffic originates from within Australia. Looking to the future, as more and more devices connect to the Internet, particularly with the looming explosion of devices under the umbrella of the Internet of Things, the problem is one that will have to be lived with for the time being.

CERT Australia offers the following threat mitigation advice. It should be noted that while these four strategies have the potential to mitigate up to 85% of targeted threats, this information does have to be tailored to suit the needs and operating environment of each business.

- patching applications & operating systems
- limiting the number of users with administrative privileges
- using multifactor authentication for critical systems
- using strong passwords/passphrases.

<https://www.cert.gov.au/advice>

All of these attacks typically rely on source address spoofing to work and the Internet Engineering Taskforce (IETF) have published a Best Current Practice (BCP) document that would mean, if implemented, a lot of the problems could be mitigated.

The BCP, BCP38, is “a simple, effective, and straightforward method for using ingress traffic filtering to prohibit DoS attacks which use forged IP addresses to be propagated from ‘behind’ an ISP’s aggregation point.” If widely implemented by ISPs, telecommunications and network infrastructure providers would see the problem of reflection attacks largely go away.⁸

⁸ BCP38 Network Ingress Filtering: Defeating Denial of Service Attacks which employ IP Source Address Spoofing IETF <https://tools.ietf.org/html/bcp38>

The challenge is making this filtering easy, automated and scalable for larger networks. It should also be enabled by default on edge network devices and require explicit configuration to allow valid networks to traverse edge routers, as suggested by the Internet Society (ISOC) paper Addressing the challenge of IP Spoofing⁹. This even goes down to the deployment of CPE, which should limit outbound traffic by default to only network addresses assigned by network providers, of which is provided by the DOCSIS 3.0 cable source verify option which is often enabled by default for many providers.

Another method is through cracking down on the use of Open DNS resolvers which are a key vulnerability exploited when it comes to reflection attacks.

One proposal that may help deal with the problem in the future is the subject of an RFC published by the Internet Engineering Task Force. RFC7873 suggests that by using a DNS cookie, which is different to a web browser cookie, mechanism “the traffic amplification obtained by requests from an attacker that is off the path between the server and the request’s source address” could be severely limited.¹⁰

But most importantly, having networks that are well configured is the best way of defeating reflection attacks.

The author would like to thank Dr Jason Smith, Technical Director at CERT Australia and Bruce Matthews, Cyber Security Manager, Australian Communications and Media Authority for their assistance with this article.

⁹ <http://www.internetsociety.org/doc/addressing-challenge-ip-spoofing>

¹⁰ Internet Engineering Task Force RFC7873: Domain Name System (DNS) Cookies by Donald Eastlake, Huawei Technologies and Mark Andrews, Internet Systems Consortium May 2016 <http://www.rfc-editor.org/rfc/rfc7873.txt>

MEMBER BENEFITS

**AUSTRALIANS VIEW .au AS A TRUSTED SPACE
ON THE INTERNET. IF YOU CARE ABOUT THE
INTERNET IN AUSTRALIA, BECOME A MEMBER**

auDA MEMBERSHIP BENEFITS:

- A VOICE IN THE FUTURE OF .au
- VOTE IN auDA BOARD ELECTIONS
- FREE ENTRY TO AUIGF
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Governance & policy

In August 2016, .au Domain Administration (auDA) announced the appointment of a new Chief Executive Officer, Cameron Boardman. Mr Boardman is the current Executive Director for Investor Engagement within the Department of Economic Development, Jobs, Transport and Resources and leads the Victorian Government's investment activities within its priority economic sectors. Previously Mr Boardman was Executive Director for Innovation, Technology and Industry Programs within the Department of State Development, Business and Innovation with responsibility to implement the government's innovation and science agenda and associated policies.

Mr Boardman has been the chief architect of the Victorian Government's Cybersecurity initiatives which has resulted in the establishment of the Oceania Cyber Security Centre, the attraction of the first international office of Oxford University's Global Cyber Security Capacity Centre and the development of CSIRO/Data61's Cybersecurity Leadership and Innovation Hub.

AusRegistry welcomes Mr Boardman to the role and looks forward to continuing the strong relationship between our two organisations under his new leadership of auDA. Mr Boardman provided the following comment to *Behind the Dot*:

"With my first contribution to *Behind the Dot*, allow me to be euphemistic and say that there has never been a more exciting time to be involved in .au.

"The National Science and Innovation Agenda, or the 'Ideas Boom', has attempted to focus the spotlight on Australia's future economy by promoting a culture of collaboration, ideas generation and government as an exemplar. For our sector, these fundamentals have underpinned our activities for many years. It is the success of the self-regulatory model that itself promotes a culture of collaboration, participation and ideas generation where auDA, AusRegistry, Registrars and the industry work together to ensure that we are not only exceeding our mutual obligations, but we are creating an international benchmark which many other economies aspire to.

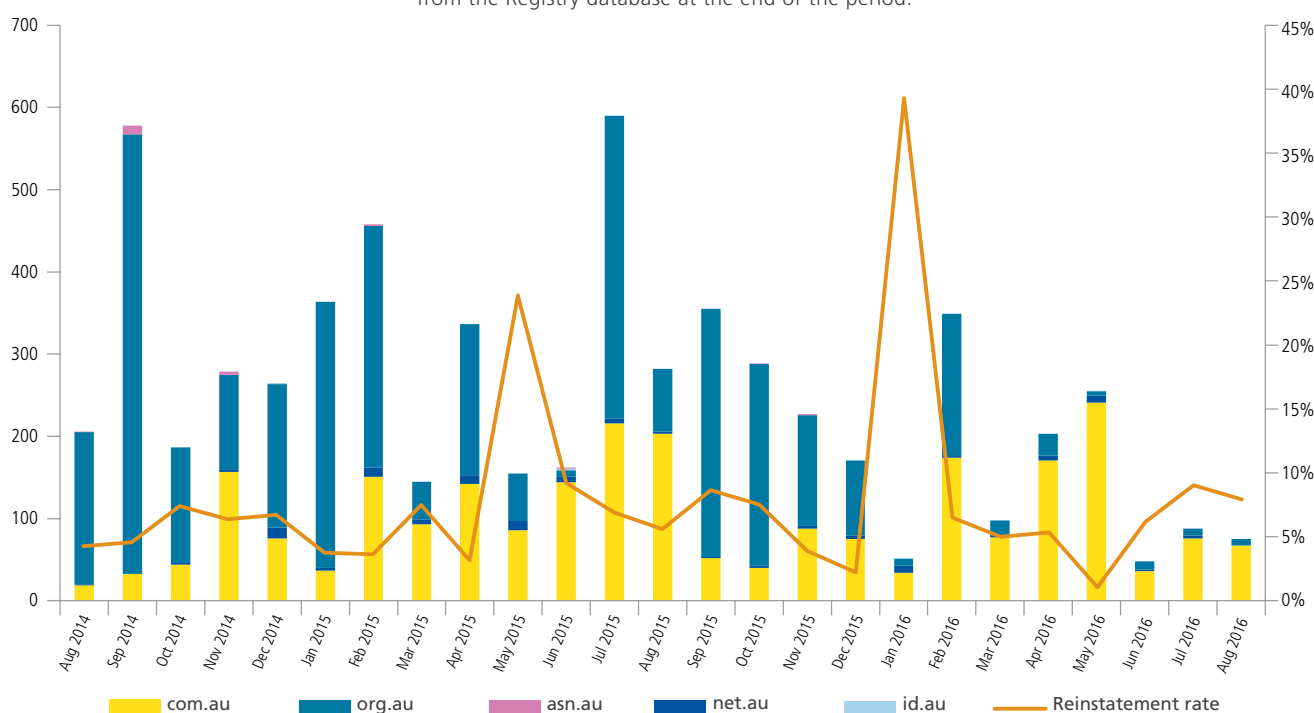
"It is this framework which I am seeking to further enhance.

"The success of the national agenda depends on governments at all levels, industry and regulators working together to achieve these outcomes. Over the next few months you will see some exciting developments and reforms at auDA which will position the organisation to meet such future challenges and contribute to ongoing success for the sector.

"It is a privilege to have been appointed CEO at this time and I look forward to working with all parties to achieve our ambitions. The auIGF in October will be an ideal opportunity to further articulate this vision and I hope to see and meet as many members, stakeholders and industry representatives as possible."

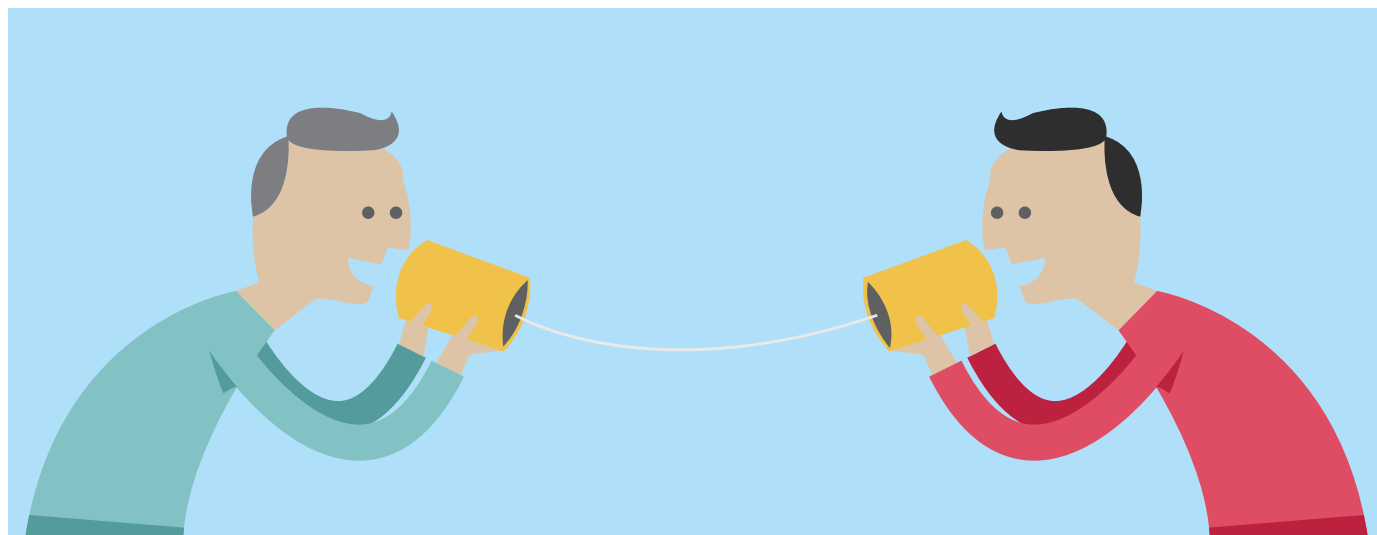
.au Policy Deletes (and Reinstatement Rate)

When auDA or the Registrar of record deletes a domain name for breach of policy, the domain name is placed into "pending policy delete" status for 14 calendar days. The domain name can be reinstated during this period, if the registrant is able to correct their breach of policy. If not, then the domain name is purged from the Registry database at the end of the period.



Channel talk

'What is one thing ICT companies could do to encourage greater gender diversity in the industry?'



Olivia Cain – Head of Business Development, NetNames Group (London)

One thing that ICT companies can do is to use communication more effectively. This can be addressed in two main ways; firstly to provide spokespeople to communicate externally on behalf of the company to discuss working in the industry and secondly to provide mentors within the company to nurture new starters once they join.

A spokesperson can offer a great deal of insight into not just what a company does, but to how they operate internally. This is beneficial as it offers a tangible link for both male and female new starters to the company itself even prior to induction.

And mentors don't need to be female in order to make a difference in a new starter's career. I have always worked closely with my (male) mentor and I strongly believe that he has provided a structure for my progression and improvement in the company.

Liz Keys – Domain Manager, Discount Domain Name Services (DDNS)

Mathematics forms such an important basis for working in ICT fields. Programs to encourage greater participation by

girls in mathematics at a young school age would help reinforce these vital skills and hopefully increase interest and participation in these areas at a tertiary or career level.

In terms of the workplace itself, ICT companies could consider in more detail policy changes that acknowledge family commitments and the importance of work-life balance. Many may be turned away by the 24/7 nature of the technology industry, so investing in flexible working arrangements, part-time or flexible roles for working mothers (and parents in general) and similar programs may attract others to the profession who otherwise may not have considered a role in ICT.

Janelle McAlister – Manager, Global Relations, MarkMonitor

The fact that the Internet industry is only three decades old and a relatively modern phenomenon should mean it reflects the modern world - so it does beg the question as to why there is still an obvious gender imbalance in the tech sector. Studies show that women make up just over a quarter of the ICT workforce in Australia and this has to be addressed for both the equality and the economy of the industry.

We could point to changing the education system to boost female IT skills but perhaps if more of the corporate tech sector overhauled its employment strategy, we may see more progress. For example, businesses could offer training programs to unemployed women or mothers wanting to return to the workforce. There is no gender balance magic wand. However, if more of the larger organisations in the sector took the lead and started actively recruiting women, offered more in terms of training and flexible working hours - that would be a step in the right direction to increasing the numbers and representation.



AusRegistry was saddened to hear of the passing of domain name industry figure

Tony Lentino in July this year. A renowned entrepreneur and founder of Instra Corp, Mr Lentino was also a much-loved figure of the Australian and New Zealand motor racing scenes. Our thoughts are with his family during this difficult time.



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Glossary

Abbreviations

2LD

Second Level Domain

ABS

Australian Bureau of Statistics

ACCAN

Australian Communications Consumer Action Network

ACS

Australian Computer Society

AISI

Australian Internet Security Initiative

APNIC

Asia-Pacific Network Information Centre

auDA

.au Domain Administration

auIGF

Australian Internet Governance Forum

ccTLD

Country Code Top Level Domain

CERT Australia

Computer Emergency Response Team Australia

DNS

Domain Name System

DNSSEC

Domain Name System Security Extensions

gTLD

Generic Top level Domain

IANA

Internet Assigned Numbers Authority

ICANN

Internet Corporation for Assigned Names and Numbers

ICT

Information and Communications Technology

IDN

Internationalised Domain Name

IP

Internet Protocol

ITU

International Telecommunication Union

STEM

Science, Technology, Engineering and Mathematics

TDUM

Total Domains Under Management

TLD

Top-Level Domain

Definitions

Asia-Pacific Top Level Domain Association (APTLD)

APTLD is an organisation for ccTLD registries in Asia-Pacific region. APTLD was originally established in 1998, and in 2003 legally established in Malaysia. APTLD works as the forum of information exchange regarding technological and operational issues of domain name registries in Asia-Pacific region.

Australian Bureau of Statistics (ABS)

The ABS is Australia's national statistical agency, providing trusted official statistics on a wide range of economic, social, population and environmental matters of importance to Australia.

Australian Communications Consumer Action Network (ACCAN)

Australia's peak body for consumer representation in communications.

Australian Computer Society (ACS)

The Australian Computer Society is the professional association for Australia's Information and Communication Technology (ICT) sector.

.au Domain Administration (auDA)

The policy authority and industry self-regulatory body for the .au domain space.

Australian Internet Governance Forum (auIGF)

Developed by auDA, the auIGF provides a unique opportunity for all who use the Internet in Australia to share ideas and experiences, discuss Internet-related policy, identify issues and engage with each other in a multi-stakeholder forum.

Australian Internet Security Initiative (AISI)

The Australian Internet Security Initiative (AISI) is an ACMA program helping to reduce malicious software (malware) infections and service vulnerabilities occurring on Australian internet protocol (IP) address ranges.

.auLOCKDOWN

.auLOCKDOWN a security measure for .au domain names that provides an added level of security for domain name Registrants. Domain names are locked at the Registry level, and changes are only possible through direct communication between the Registrar authorised contact and the Registry, by following a strict authentication process.

AusRegistry

The Registry Operator for the open 2LDs (com.au, net.au, org.au, asn.au, and id.au); the community geographic 2LDs (act.au, nsw.au, nt.au, qld.au, sa.au, tas.au, vic.au and wa.au); and two closed 2LDs (edu.au and gov.au).

Country Code Top Level Domain (ccTLD)

A TLD that is used to represent a country or external territory. Some examples of ccTLDs are '.uk' for the United Kingdom, and '.au' for Australia.

Computer Emergency Response Team Australia (CERT Australia)

CERT Australia (the CERT) is the national computer emergency response team.

Domain Name/Domain

An identification string that defines a realm of administrative autonomy, authority, or control on the Internet. Domain names are formed by the rules and procedures of the DNS. Any name registered in the DNS is a domain name.

Domain Name System (DNS)

A hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network. It associates various information with domain names assigned to each of the participating entities. Most prominently, it translates easily memorised domain names to the numerical Internet Protocol (IP) addresses needed for the purpose of locating computer services and devices worldwide.

Domain Name System Security Extensions (DNSSEC)

Domain Name System Security Extensions (DNSSEC) is a security extension that facilitates the digital signing of Internet communications, helping to ensure the integrity and authenticity of transmitted data.

Internationalised Domain Name (IDN)

A domain name that includes characters from scripts other than the 26 letters of the Latin alphabet (a–z). An IDN can contain Latin letters with diacritical marks, or may consist of characters from non-Latin scripts.

Internet Assigned Numbers Authority (IANA)

A department of ICANN, which oversees global Internet Protocol (IP) address allocation, autonomous system number allocation, root zone management in the DNS, media types, and other IP-related symbols and numbers.

Information and Communications Technology - ICT

ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums.

Internet Corporation for Assigned Names and Numbers (ICANN)

The global DNS administrator, formed in 1998, is a non-profit public-benefit corporation with global participants dedicated to keeping the Internet secure, stable and interoperable. It promotes competition and develops policy on the Internet's unique identifiers.

Internet Protocol (IP) Address

An IP Address is the numerical address by which a location in the Internet is identified. Computers on the Internet use IP Addresses to route traffic and establish connections among themselves; people generally use the human-friendly names made possible by the Domain Name System.

International Telecommunication Union - ITU

ITU is the United Nations specialized agency for information and communication technologies – ICTs.

IPv6

Internet Protocol (IP) addresses uniquely identify devices on the Internet. Currently, almost all devices connected to networks use the IP version 4 (IPv4) address system. IPv4 has more than 4 billion possible address combinations, but these are being used up quickly. APNIC reached its last block of IPv4 addresses in April 2011.

Internet Protocol version 6 (IPv6) was developed to ensure the continued growth and innovation of the Internet. IPv6 offers an extremely large (2¹²⁸) address space, as each address is 128 bits long, rather than 32 bits.

Registrant

An entity or individual that holds a domain name licence.

Registrar

An entity that registers domain names for Registrants and in the case of the .au ccTLD, is accredited by auDA.

Registry

The registry comprises of a database of domain names registered in each 2LD and a public WHOIS service for looking up the identity of the registrant of a domain name.

Reseller

An entity appointed by accredited Registrars to increase the retail channel of .au domain names.

Second Level Domain (2LD)

The alphanumeric string before the dot and the TLD. AusRegistry is the Registry Operator for the open 2LDs (asn.au, com.au, id.au, net.au and org.au); the community geographic 2LDs (act.au, nsw.au, nt.au, qld.au, sa.au, tas.au, vic.au and wa.au); and two closed 2LDs (edu.au and gov.au).

Science, Technology, Engineering and Mathematics (STEM)

STEM is an acronym that refers to the academic disciplines of Science, Technology, Engineering and Mathematics. The term is typically used when addressing education policy and curriculum choices in schools to improve competitiveness in science and technology development.

Total Domains Under Management (TDUM)

Total number of domain names registered in the namespace.

Zone

A portion of the namespace in the DNS for which administrative responsibility has been delegated.

Data References

Domain numbers in the APTLD region:

China - .cn

www1.cnnic.cn/IS/CNym/CNymtjxxcx

Indonesia - .id

<https://www.pandi.id/content/statistik>

Japan - .jp

jprs.co.jp/en/stat

Korea - .kr

isis.kisa.or.kr/eng

New Zealand - .nz

dnc.org.nz/content/2014-09_stats.html

Qatar - .qa

domains.qa/en

Singapore - .sg

www.nic.net.sg/page/registration-statistics

Malaysia - .my

www.mynic.my/en/statistics.php

Hong Kong - .hk

www.hkirc.hk/content.jsp?id=77#!&in=/aboutHK/registration_statistics_hkirc.jsp

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