

TRADE & INVEST | Good people do their best work in Wales

# THIS IS CYBER

One of the most sophisticated cyber security ecosystems in Europe. This is Wales.



# Think Cyber... Think Wales.

When industry, academia and government work together, anything's possible. The cyber ecosystem in Wales has created the perfect conditions for one of the most technically advanced and fast-moving industries in the world. We're a nation where forward-thinking cyber security companies can thrive.



LEE WATERS MS  
Deputy Minister for  
Economy and Transport

For the size of our clever nation, we have one of the biggest cyber security ecosystems in the UK, and one of the strongest in Europe. We're proud to say that when it comes to developing the tech and ideas that'll keep systems and critical infrastructure safe for future generations, we're truly world-class. Not that we in Welsh Government are claiming credit for that, by the way.

The plaudits belong to global tech giants like Airbus, Thales, General Dynamics, Oracle and Qinetiq: world-leaders in cyber security, who have made Wales their home. It's also down to dynamic home-grown start-ups, who are bringing their own unique ideas to the world stage.

Our universities have created centres of excellence, producing world-class research, and talented graduates with the specialist skills the sector demands. Industry and academia have formed intimate partnerships, working together to form academies. They're tackling real-world problems, as well as creating the free-thinking conditions that open unexpected doors, leading to breakthroughs we haven't yet dreamed of.

We've also been leading the way in tackling gender diversity in the industry. The Women in Cyber Wales Cluster was established back in 2018 to provide an opportunity for networking and support, where women aren't in the minority. The group provides a platform for women to share the amazing work they're doing in the field, and they're also helping to inspire girls to consider careers in digital and STEM subjects.

Our geography helps, too. We're located very close to – and work very closely with – the National Cyber Security Centre at the home of GCHQ in Cheltenham, and the MoD's cyber operations in the West Country. London is just a couple of hours away.

With all this expertise, the job of Welsh Government is simple: to create the best conditions for it to happen. To enable, encourage and support.

We offer some of the best financial support packages in the UK to encourage industry and academics to collaborate on the latest cyber technologies. What's more, we're committed to helping innovative new firms establish themselves here and develop new ways of tackling the security challenges ahead. Wales is a nation where forward-thinking companies can get all the support they need to thrive. You can read their stories in these pages. And you can become part of the story.

Tell us what you need. We'll do everything we can to help.



## WALES TECH SECTOR

Value	£8bn+
Companies	3,000+
Tech workers	40,000+



**You've got government, law enforcement, academia, businesses both large and small... having that rich, vibrant diversity, with all the different skills and backgrounds they bring, gives Wales a huge advantage.**

Paul Chichester  
Director Operations,  
National Cyber Security Centre

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**Our cyber ecosystem:**  
Cluster groups in both North and South Wales, with close connections to the rest of the UK, make Wales a world-leading hub in cyber security. South Wales forms part of the Severn Valley Cyber Region, which includes Malvern, Cheltenham (GCHQ), MoD Corsham, and MoD procurement at Abbey Wood.



We're good at what we do. Our reputation for excellence is known throughout the cyber community, both in the UK and around the world. These are our key cyber strengths.



# 1.

**Internationally recognised**  
Wales is a world-leading destination for cyber security businesses.

Cyber Wales is one of 14 founding members of Global EPIC, which brings together the world's foremost cyber security communities from 18 countries spanning six continents.

In 2019, Wales saw major cyber security investments from the likes of SANS, Thales and Airbus.

# 2.

**UK region of excellence**  
Wales is home to one of the largest cyber security ecosystems in the UK.

With over 2,000 members, the North and South Wales Cyber Security Clusters have been formed by industry under the Cyber Wales umbrella.

The South Wales Cyber Cluster is the largest by membership and attendance in the UK.

Wales hosts CYBERUK, the UK Government's flagship cyber security event, in May 2021 at the International Convention Centre in Newport.

# 3.

**Location**  
Wales is close to — and works closely with — the National Cyber Security Centre, and key multinational companies.

South Wales is part of the Severn Valley Cyber Region which also encompasses Malvern, Cheltenham (GCHQ), MoD Corsham, and MoD procurement at Abbey Wood.

Wales is home to several Tier 1 companies who partner with innovative Wales-based companies.

# 4.

**Innovation**  
Welsh Government offers some of the best financial support packages in the UK to encourage industry / academic collaboration.

Wales has cyber expertise in operational technology (OT), industrial control systems (ICS), industrial internet of things (IIoT), monitoring, detection and analysis.

Our supportive environment also enables businesses and academia to develop breakthrough technologies in artificial intelligence, machine & deep learning, and user behaviour analytics.

# 5.

**Academic excellence**  
Welsh universities offer world-class academic research and education in cyber security.

Cardiff University's Centre of Excellence in Cyber Security Analytics has NCSC 'Academic Centre of Excellence in Cyber Security Research' (ACE-CSR) status.

The Cyber Threats Research Centre (CYTREC) at Swansea University has experts with backgrounds in law, criminology, political science, linguistics and psychology. CYTREC explores a wide range of online threats.

The University of South Wales and Welsh Government joined forces to establish the National Cyber Security Academy (NCSA). Undergraduates work on real-world projects set by industry partners like Thales, Airbus and Cisco.

# 6.

**Industry / government partnership**  
Welsh Government forms joint initiatives that demonstrate our agility, innovation and determination to grow our cyber security sector.

Cyber Wales collaborates and shares best practice among the four key sectors that make up our cyber ecosystem: Industry, Academia, Government and Defence.

In partnership with Thales, Welsh Government established a £20m cyber centre — The National Digital Exploitation Centre (NDEC).

Airbus Endeavr Wales is a Welsh Government / Airbus joint venture company that 100% funds research and technology projects in priority cyber areas.

## WALES' AREAS OF EXPERTISE

INFORMATION RISK ASSESSMENT & MANAGEMENT

IDENTIFICATION, AUTHENTICATION & ACCESS CONTROL

OPERATIONAL TECHNOLOGY (OT)

INDUSTRIAL INTERNET OF THINGS (IIOT)

MACHINE & DEEP LEARNING

THREAT INTELLIGENCE, MONITORING, DETECTION & ANALYSIS

SCADA & INDUSTRIAL CONTROL SYSTEMS (ICS)

AWARENESS, TRAINING & EDUCATION

INCIDENT RESPONSE & MANAGEMENT

ARTIFICIAL INTELLIGENCE (AI)

BEHAVIOURAL SCIENCE / HUMAN FACTORS



# DEFENCE IN DEPTH

**Airbus** is a centre of excellence for cyber security and cryptography. From their South Wales base, they're protecting us — and the world — from the dark forces that are stalking cyberspace.

[airbus-cyber-security.com](https://airbus-cyber-security.com)



## The skill sets we have here are certainly best of class in the UK.



AIRBUS DEFENCE & SPACE

Location
Newport, South Wales
Founded
2014
Employees
450

The world is under siege from invisible, malign forces: cyber attackers. Around half of British firms were hit by some form of attack in 2019. “There’s never a boring day at the office,” says Richard Goodall, the Head of Cyber UK at Airbus CyberSecurity in Newport.

They specialise in defending companies, government and defence organisations against malicious attacks from... well, anyone and everyone.

“It could be a kid in his loft, or hackers with a political agenda,” says Richard. “Then there’s criminal activity and industrial espionage. And if you’re involved in defence, state actors are also a threat. So the threats come from everywhere, and we have to be ready to protect from all of them.”

They’re very good at what they do. So much so, they’re entrusted to protect the Ministry of Defence’s vast secure communications network, in the UK and overseas. They protect NATO’s field operations, and are aligned very closely with the National Cyber Security Centre (NCSC) and its parent organisation, Government Communications Headquarters (GCHQ), based in Cheltenham.

Andrew Harmsworth, who leads the Airbus secure communications team, says: “We’ve been protecting UK Defence communications for over 20 years, and in that time they haven’t had a major outage as a result of a hack. And that’s thanks to the skills that we have.”

They can protect anything from being hacked, anywhere — even if it’s an RAF Typhoon fighter flying at Mach 2 over a war zone. These military applications are filtering down into the civilian world, says Andrew: “The MoD has the ultimate requirement, because you don’t want anyone to be able to hack into a plane and drop a bomb. But that requirement is flowing down into the commercial world. The importance of IT security is rising in emergency services, government, utilities, critical national infrastructure. It’ll flow into financial services, the public sector, schools.”

Cyber attacks are increasing every year. In the Airbus Secure Operation Centre at Newport, where customers are monitored and protected 24/7, one of their customers registered 1.5 billion incidents in a single month.

“Not all of those incidents will be attacks,” says Richard Goodall. “Some will be anomalies, some may be early probes. But to use a terrorism analogy, an attacker only has to be lucky once. We have to be ready 1.5 billion times. And that’s what we do exceptionally well.”

“The skill sets we have here are certainly best of class in the UK. We’re recognised as a centre of excellence for cyber security and cryptography, and that draws people into Wales. The Welsh Government was very encouraging in terms of us locating here, and their support continues to be a reason we wish to stay.”



### Wales Aerospace and Defence Cluster

The aerospace and defence industries in Wales are thriving. We’re home to an international cluster which provides world-class innovation, expertise and training, from university research to government and private sector projects.

As part of the UK’s defence operations, Wales has around 100 companies involved in creating defence products and applications such as hardware, communications, software, biometrics, optical design and imaging. It has shown dynamic growth with the broad availability of secure sites and airspace coupled with specialised skills key enablers.

Both aerospace and defence are supported by the Aerospace Wales Forum, the key trade association for all companies in the sector. It is committed to exploring new ideas and finding new clusters / collaborations for members, giving them access to events, networking opportunities and industry expertise.

[aerospacewalesforum.com](https://aerospacewalesforum.com)

# Teamwork packs more power.

It's good to talk. With a membership of over 2,000 that spans the whole country, **Cyber Wales** is a representative body with the aim of being the heart and voice of the cyber community in Wales.

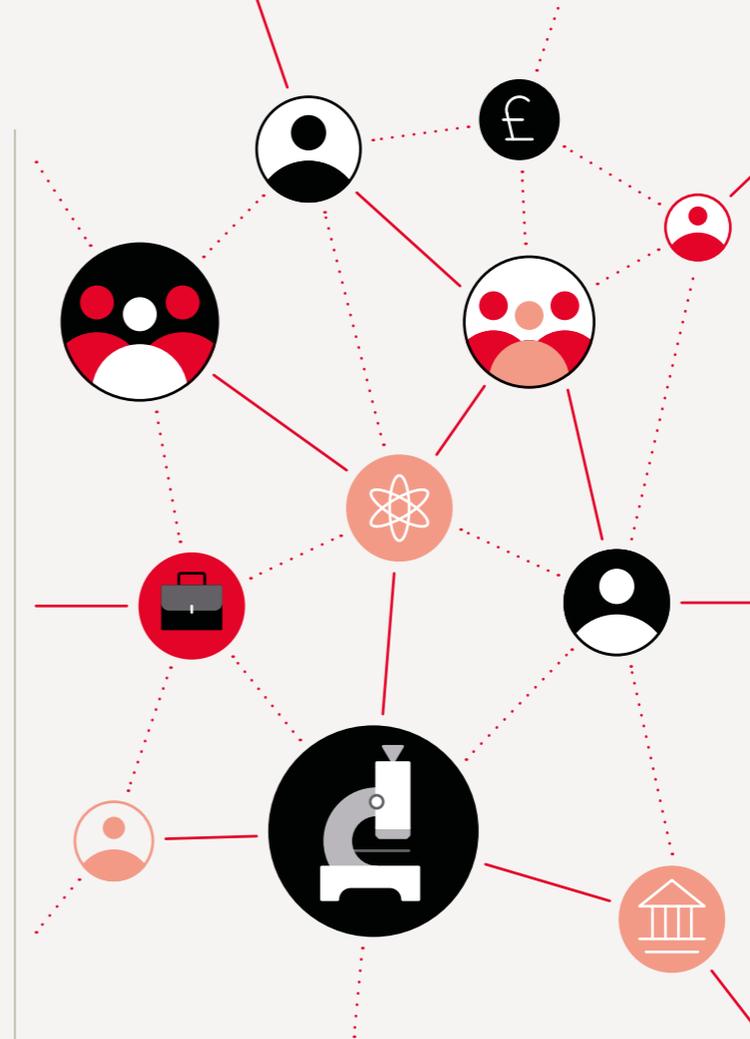
There are currently nine clusters in the Cyber Wales ecosystem which are friendly, open and collaborative gatherings, with Welsh cakes for all. It's not how most people would picture the supposedly secretive cyber security industry. But according to John Davies, CEO of Pervade Software and co-founder of Cyber Wales, this kind of informal collaboration is essential. "As a nation, we're naturally very collaborative," he says. "We are famous for rallying around a good cause, to help each other and the wider community. The cyber threat is daunting and growing every day, so if we do not all work together to share knowledge and find new ways to fight cyber attacks, we won't be able to combat it."

In 2014, Davies established the South Wales Cyber Security Cluster, a monthly meet-up for anyone involved in cyber security, with Dr Cerian Jones, partner at law firm UDL. Both felt that cyber security people should have a forum in which they could discuss industry issues face-to-face. Dozens of organisations soon joined to help drive the idea forward. The movement grew rapidly and within a year the North Wales Cyber Security Cluster, founded by Jason Davies of Hashtag Cyber in Wrexham, was formed. He says, "It got to the point where we couldn't fit everyone who wanted to attend in our cars to go down south, so we formed our own cluster."

These two geographic clusters were followed by subject-specific clusters, including:  
 —*Capture the Flag Cluster*  
 —*Education & Training Cluster*  
 —*Women in Cyber Wales Cluster*  
 —*Critical National Infrastructure Cluster*  
 —*Data Protection Cluster*  
 —*IP Wales Cluster*

In just six years, Cyber Wales can point to many real-world successes. New companies have been formed to take innovative ideas to market and joint ventures have grown out of members meeting at clusters. In 2017, Cyber Wales was invited to become a founding member of GlobalEPIC, the Global Ecosystem of Ecosystems Partnership in Innovation and Cybersecurity, that today includes 30 cyber ecosystems in 18 countries spanning six continents.

Having memorandums of understanding and collaboration with more than 30 international partners provides unparalleled access to cyber expertise. As an example of how this global collaboration works, each country's ecosystem undertakes to provide a 'soft landing' to help any other members who want to set up businesses or research projects in a different country, helping with mentoring, desk space and introductions to key players. Already, cyber



CYBER WALES

Location	Nationwide
Founded	2014
Members	2,000+



businesses from Japan, Israel and the UAE have used the programme to establish a presence in Wales and Welsh companies have established themselves in Canada, Dubai and European countries.

Wales benefits from having the UK Government's National Cyber Security Centre (NCSC, part of GCHQ) sitting at the head of the 'Severn Valley Cyber Launchpad' on the Welsh border. NCSC are recognised as being one of the best sources of cyber capability and intelligence in the world and, combined with assistance from DCMS, DIT, FCO, TechUK, other UK clusters and global partners, Cyber Wales are able to gather and share vast amounts of advice and guidance.

Davies says, "This recognition means organisations at home and abroad are realising that they don't need to go to London to find cyber security experts. We have a real field of diamonds right here in Wales when it comes to cyber. So, if you want to learn more about careers in cyber, secure your organisation and / or grow your cyber business, then come to Wales!"

## Global excellence

Cyber expertise in Wales has been recognised and acknowledged on the global stage.

Cyber Wales is one of the 14 founding members of the Global Ecosystem of Ecosystems Partnership in Innovation and Cybersecurity.

Global EPIC brings together the world's foremost cyber security communities from 18 countries spanning six continents to collaborate on cyber security innovation. Its members include MIT in the United States, the Hague Security Delta in the Netherlands and CyberSpark, the Israeli Cyber Innovation Arena.

[globalepic.org](http://globalepic.org)



**As a nation, we're very collaborative. We're famous for rallying around a good cause, to help each other and the wider community.**

# ETHICAL HACKERS

The goal of award-winning cyber security consultancy **Wolfberry** is to make cyber security accessible, understandable and affordable for any organisation, says CEO Damon Rands.

[wolfberrycs.com](http://wolfberrycs.com)



Pack leader:  
Wolfberry CEO Damon Rands.

**W**olfberry's aim is to support our clients working across all sectors and protect their processes and data from all types of cyber security risks, both internal and external. This is achieved through a full range of managed services, which includes award-winning penetration testing services, cyber essentials certification, phishing simulations, ransomware preparation and recovery consultancy, as well as the innovative and award-winning Viper threat detection and vulnerability scanning service. All of these ensure that our clients are wrapped in a suite of services designed to meet their needs.

It's an exciting time to be working in this field in Wales. We're lucky to have the Cyber Wales clusters in both North and South Wales. Through the clusters, we can collaborate effectively. We've worked with other cyber security businesses on projects that previously would only have been viable if carried out by large companies. Now we can pool our resources, and I think that's the reason we're so successful. We're not secretive and we like working together. Likewise, we've had great support from the Welsh Government, who have got behind us and helped to create this ecosystem.



**We pool our resources, and that's why we're so successful. We like working together.**

Wolfberry collaborates closely with academia. We've worked with the Cyber Academy at the University of South Wales, which takes on real-world projects to upskill its students, and also with Swansea University. It's all helping to address the critical shortage of cyber security skills across the globe — not just in Wales.

Because of this, recruitment can be a challenging task. We have to be careful to pick the right staff as our company grows and diversifies. It's not just systems testing any more — we also do network monitoring from our security operations centre in Cardiff, dark web monitoring, phishing simulation and virtual CISO (Chief Information Security Officer) support.

As for the future, the sky's the limit. We've recently opened an office in Dubai and were honoured to have been awarded the UK's Most Innovative Cyber Security Company at the Corporate LiveWire Innovation & Excellence Awards 2020. More than 23,000 nominations were received by the awards team from 32 countries around the world. Winners were chosen for industry recognition, innovative use of technology, marketing and branding, service excellence and ethical practice. We were also recently announced as Best International Cyber Security Consultancy Firm in the UK, and named as the highest-placed cyber security organisation within the WalesTech50 awards.

We're planning to expand and at least treble our workforce, but we'll be staying in Wales. I'm proud to be Welsh, and I'm proud that my company is based here. It's a wonderful place for cyber security companies because everything is on your doorstep, from fantastic broadband services to world-class universities — not to mention a wonderful quality of life.



WOLFBERRY

Location  
Cardiff

Founded  
2016

Employees  
11



# The human factor.

It's not all about whiz-bang tech (although we've got plenty of that). Cyber security is about people, too — which is why the **Cyber Innovation Hub** is studying how human psychology can influence the safety of our systems.



**Hubbing together:**

*“The Cyber Innovation Hub is a fantastic example of how, working together, we can boost important research into this critical, fast-developing sector which helps to protect not only Airbus’ own products and systems but those of our customers around the world.”*

Katherine Bennett CBE,  
Airbus Senior Vice President for the UK



**CYBER INNOVATION HUB**

**Location**  
Airbus, Newport, South Wales

**Founded**  
2019



**A** Cardiff University psychologist is heading up an Airbus-led study into how people play a part in cyber security. The Human-Centric Cyber Security Accelerator brings psychology experts together with a range of partners, including Cardiff University and the UK’s National Cyber Security Centre (NCSC).

It’s happening at the Cyber Innovation Hub, which opened in 2019 at Airbus’s Newport base. The Hub hosts leading cyber security research initiatives, incubators and accelerators, and academic research partnerships. Key areas of research include the protection of industrial control and safety critical systems, artificial intelligence and data analytics. It also explores the human factors of cyber security.

Humans are often seen as the weakest link in the cyber security chain. Globally, 990 million records were exposed due to human error in 2019. But the team behind the Airbus Accelerator aims to demonstrate that humans can be a strong cyber defence for organisations, through effective interventions based on research.

The project is under the technical leadership of Cardiff University psychologist Dr Phillip Morgan, who is on a three-year secondment to Airbus. He said, “This is an exciting opportunity for the University because it allows us to work within Airbus, with a workforce of over 135,000 and with a team of over 800 security specialists, to shape and accelerate research programmes and projects in the critical area of human-centric cyber security.”

The partnership is supported by Airbus Endeavr Wales, a joint initiative between Airbus and the Welsh Government to drive ground-breaking innovation in Wales.

“We are seeking to challenge the common cyber security industry perception that people are always the weakest link, and will offer crucial insights into human-centric approaches that work with and engage people with the outcome of improving cyber security effectiveness,” said Dr Morgan.

The team will develop human-centric tools, techniques and methods tailored towards human cyber strengths, including cognitive flexibility, self-awareness, and adaptability, to optimally protect employees against cyber-attack attempts. Their findings will be rolled out across Airbus, and also shared with partners including affiliated universities, the NCSC and industry partners, in an attempt to drive a step change in thinking for the cyber security community.

The human factor is just one of many projects at the Cyber Innovation Hub, where state-of-the-art Research & Innovation programmes develop breakthrough technologies which are then transformed into prototypes and demonstrators by incubation projects. Accelerator programmes industrialise these solutions and run pilot projects across the wider business.

Dr Kevin Jones, Group Chief Information Security Officer (CISO), said, “The Cyber Innovation Hub is further recognition of the strategic importance of the cyber security research and innovation programme for Airbus. It demonstrates the company’s commitment to cyber security and recognises the value of the cyber security ecosystem in Wales and further enhances the ‘Cyber Wales’ brand on a global scale.”

**“**  
*A joint initiative between Airbus and the Welsh Government to drive ground-breaking innovation in Wales.*

## The Alacrity Foundation

Alacrity is a unique educational charity whose mission is to mentor and train graduates to create the next generation of hi-tech companies in Wales.

Operating since 2011, Alacrity is a collaboration between the Welsh Government, industry and investors. A new dedicated Cyber Programme was launched in 2020. The 15-month educational programme delivers practical business training and software skills as part of an entrepreneurship programme for graduates. Typically in teams of four, the graduates develop real, business-focussed projects with public and private sector mentors.

On graduation, the teams launch start-up technology companies based in Wales, receiving seed funding support of £250,000 from the Welsh Government and a private sector investor.

[alacrityfoundation.co.uk](http://alacrityfoundation.co.uk)



# SECURITY MADE SIMPLE

**Pervade Software** was voted one of the Most Innovative Cyber Security Companies in the UK in the annual competition run by the UK Government, TechUK and Infosecurity Europe. The prize was the opportunity to showcase their products on stage at InfoSec — Europe’s largest cyber security trade show.

[pervade-software.com](http://pervade-software.com)



## We’re making a difference, constantly innovating, creating some really cool stuff and enjoying every minute of it.

**L**ike many start-ups, Pervade owes its existence to a specific technical challenge — and a eureka moment when its founders realised how it could be solved. In their case, the challenge was how to successfully monitor all of the different data types needed for cyber security without having to buy an array of expensive systems to do it.

CEO John Davies says, “The problem is that you need to monitor different sources of data, such as the logs that register what’s happening on your devices at any given moment, and then compare spurious activity to configuration files or performance data or vulnerability scans, etc. These are all very different types of data and it takes a separate system to monitor each one so organisations either spend tens (or hundreds) of thousands of pounds on multiple systems that provide too much information, or they resort to cheap black-box solutions which typically just run a handful of scripts and provide hardly any useful information at all.”

The company was formed in Cardiff in 2009 and after more than two years of self-funded development the solution was built. This formed the basis for the company’s first product, OpView, which is now deployed in more than 80 countries by clients ranging from multinational tech firms to law enforcement agencies and healthcare.

This new approach to collecting, correlating and reporting on multiple data sources in a single configurable system turned out to have benefits beyond the Security Operations Centre (SOC).

Josi Kaal, Head of Marketing, says, “We decided to do some market validation and asked our clients why they’d bought our product. It almost seemed too obvious: after all, it remains the only product on the market that can do the job of dozens of monitoring systems in one. However, it turned out that the real driving force was compliance. Companies need to demonstrate that they have appropriate technical and organisational measures in place to be compliant

with GDPR as well as gain certifications such as Cyber Essentials, IASME, ISO27001 or NIST. Gathering this evidence involves a huge range of data sources and that was what the Pervade database was built to do.”

Taking these insights on board, Pervade quickly developed a second product. OpAudit is the only system on the market that can gather and manage all forms of evidence of compliance including declarations and evidence from stakeholders (attestations), technical data from devices (audits) and questionnaires from staff and supply chain (assessments) for both external standards and internal policies. This ground-breaking capability proved every bit as popular as the monitoring solution and it went on to become the platform for the UK Government’s Cyber Essentials scheme.

“We haven’t stood still, though,” says Jonathan Davies, CTO. “Leveraging the fact that almost all of our team are ethical hackers and / or threat hunters by trade, we have expanded our portfolio with a third product, OpIndex. Designed to sniff out threats in the Dark Web, it has found favour with legal firms and security businesses alike. Our system has yielded the most accurate counts and profiles of Dark Nets such as the TOR Network and our focus is on helping the police and the armed forces in their ongoing battles at the front lines of the cyber war.”

A key to Pervade’s success has been its decision to go for steady growth rather than take venture capital, John Davies believes. He says, “We’re 100% self-owned and we’ve never taken any finance. We want to grow organically. It’s slow, but it gives us total control over what we do next and we don’t have to force-grow the business to keep investors happy. That’s not what we’re about. We’re doing what we want to do, we’re making a difference, constantly innovating, creating some really cool stuff and enjoying every minute of it. Oh, and did I mention that we are Welsh!”



PERVADE

**Location**  
Cardiff, South Wales  
**Founded**  
2009  
**Employees**  
12





ALL 22 LOCAL AUTHORITIES ACROSS WALES HAVE WELSH GOVERNMENT FUNDING TO GAIN CYBER ESSENTIALS PLUS CERTIFICATION



NHS WALES HAS GIVEN CYBER AWARENESS TRAINING TO 50,000 OF ITS STAFF, INCLUDING ALL HOSPITAL STAFF, GPs AND PHARMACISTS



WELSH GOVERNMENT FUNDING HAS ENSURED KEY INFORMATION FROM GETSAFEONLINE.ORG IS AVAILABLE THROUGH THE MEDIUM OF THE WELSH LANGUAGE IN ORDER TO REACH ALL MEMBERS OF WELSH SOCIETY



# Thank you for looking after us while we try and look after you.

The cost of cyber attacks can be counted in money, time and inconvenience. But when hackers threaten our healthcare system, our lives are at risk. While NHS Wales was battling COVID-19, the cyber community rallied round to help save lives.

In 2017, the WannaCry ransomware attack wreaked havoc in the National Health Service (NHS) in England and Scotland. But it barely caused a ripple in NHS Wales, thanks to its robust cyber security protocols. The global coronavirus pandemic, however, presented a huge challenge — medically and technically.

Many of the hospitals and medical centres around Wales had just received new desktops and laptops to help deal with the increase in demand on their services due to COVID-19. With medical staff already stretched to the limit, NHS Wales reached out for IT support, and Cyber Wales was asked to step in.

John Davies, CEO of Pervade Software and chair of Cyber Wales, said at the time: “With our knowledge and skills, this is one area where the cyber community in Wales can offer practical help. To show the scale of the problem, one

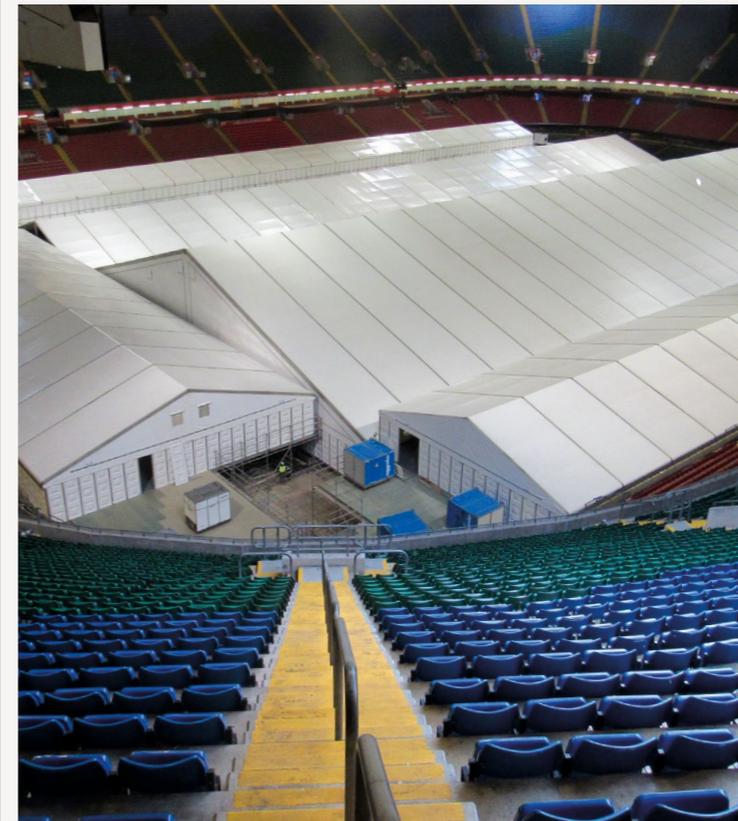
hospital just took delivery of 1,000 machines and there is no-one there to set them up. This is happening across Wales right now — we know that the Welsh cyber community will respond positively to the call.”

And they certainly did. Quite apart from offering to help set up machines for NHS Wales, the community flexed its considerable muscle in cyber security.

Pervade Software immediately mobilised their own staff. “We have teams installing our OpView SIEM system into eight NHS trusts as we speak, so we have people on hand already,” said John Davies.

Another award-winning Welsh company, Awen Collective, offered its Profile cyber software free throughout 2020 to all healthcare providers, including suppliers and manufacturers of ventilators, face masks and hand sanitisers.

Dragon’s Heart Hospital: The Principality Stadium in Cardiff was used in the fight against COVID-19.



Awen Collective CEO and co-founder Daniel Lewis said: “Our health services need all the help they can get right now, so we’re doing what we can to keep them focused on delivering their critical services. Unbelievably, there’s already evidence of international cyber attacks targeted at healthcare services during the coronavirus outbreak, so they need as much protection as possible at this crucial time.”

Tech giant Thales, which already had a close working relationship with the Welsh Government through the joint £20m National Digital Exploitation Centre (NDEC) in South Wales, stepped in to give the NHS Wales Informatics Services team free access to OpenCTI, its cyber threat intelligence platform. Thales provided NHS Wales with tailored weekly reports, access to a web portal where NHS Wales could perform its own threat analyses, full integration of Thales’s threat intelligence platform, and access to the combined knowledge of some of the world’s leading experts in cyber security — all free of charge.

Nick Lewis, IT security manager with the NHS in Wales, said: “NHS Wales says a huge thank you to all of the Cyber Wales cluster members. Thank you for looking after us while we try and look after you.”



## Fighting crime online

There’s no safe place online for criminals. The Welsh Government works closely with the four Welsh Police Forces and our two Regional Organised Crime Units (ROCU): NW ROCU covering North Wales, and Tarian ROCU in Mid & South Wales.

Tarian is also home to the Regional Cyber Crime Unit (RCCU), which collaborates with the National Cyber Crime Unit (NCCU) to provide a national response to the most serious cyber crimes.

They all feed into initiatives such as the Welsh CiSP (Cyber Security Information Sharing Partnership), a joint industry and government initiative to exchange cyber threat information in real time.

Police also keep the community informed: in 2019, in partnership with Welsh Government, Tarian ran a cyber awareness roadshow around Wales giving free cyber security advice to around 400 businesses and 1,500 members of the public.

Symon Kendall, Tarian’s Detective Constable, said: “Most campaigns rely on social media and website information, and most cyber security events are attended by those interested in cyber security, so we are not reaching the general public and small businesses. This project was designed to help remedy this.”

Paul Chichester, Director for Operations, National Cyber Security Centre, said: “The NCSC is committed to making the UK the safest place to live online. It’s imperative we all understand what threats are out there, and what the most effective ways are of managing them.”

[tarianrocu.org.uk](http://tarianrocu.org.uk)



Government, industry and academia have joined forces to create a centre of global cyber excellence. **The National Digital Exploitation Centre (NDEC)** offers its cyber services to everyone, from local schools to multinational giants.

[ndec.org.uk](http://ndec.org.uk)

**T**he Welsh Government worked with global technology company Thales to establish a £20m cyber centre in South Wales. The National Digital Exploitation Centre (NDEC) in Ebbw Vale is the first R&D facility of its kind in Wales, and provides the perfect setting for SMEs and microbusinesses to test and develop their digital concepts. It also provides a research lab in which multinationals can develop major technology advances.

In collaboration with the University of South Wales, the centre also runs an Advanced Cyber Institute that provides a base for academic research, and also operates a Digital Education Centre to train SMEs, schools and individuals with the cyber skills they need to protect themselves online.

The smart glass-and-timber NDEC building is as hi-tech as its occupants, with low carbon and sustainable technologies built into its fabric: air source heat pumps, solar thermals, photovoltaic panels, electric car charging points, natural ventilation and day lighting. This makes it both a planet-friendly and attractive environment to be in.

The NDEC was jointly funded by the Welsh Government and Thales, who each invested £10m in the centre. Thales is a global engineering company, headquartered in Paris, with divisions that serve the aerospace, defence, transportation, space and security sectors. Thales has 64,000 employees in 56 countries.

In Wales, the company supports around 500 jobs in the supply chain and contributes an annual £50m impact to our GDP. In its first year of operation, the NDEC put £1m back into the local economy: 20 of its 53 local suppliers are based in Ebbw Vale, and it employed over 90 per cent of its start-up staff from the area.

In addition to the NDEC, Thales employs 60 people in Aberporth, where the site specialises in unmanned aerial vehicles (UAVs), including the Watchkeeper surveillance UAV programme. The Aberporth facility has had a further £10m of investment from Thales.

Gareth Williams, Vice President, Secure Communications and Information Systems, Thales, said: “The NDEC acts as a cornerstone of our cyber security capabilities in the UK, providing a test bed for our technology. It will be a centre of cyber and digital development and education, and a connection for South Wales to major technology centres across the UK.”

**Digital democracy:**  
Education Minister Kirsty Williams (right) visits the £20m NDEC cyber centre, a cornerstone of our cyber security capabilities in the UK. ©Thales

The NDEC has four main areas:

**Applied digital trust environment**

Here, businesses and organisations can access resources to design, develop and integrate their products and services, risk-free, with the aim of supporting regional business growth.

**Project zone**

This is where businesses and individuals can get hands-on with technology in a well-equipped and secure environment, in conjunction with the digital trust environment.

**Digital education centre**

Led by the University of South Wales, this area focuses on schools, citizens and SMEs, delivering training and education to help promote digital awareness, skills and understanding.

**Advanced cyber institute**

This area works to secure external funding for academia, and provides an environment that stimulates new designs and turns good ideas into deliverable products and services.



NDEC

**Location**  
Ebbw Vale, Blaenau Gwent  
**Founded**  
2019



**SANS Institute**

SANS Institute, the most trusted and by far the largest source for information security training and security certification in the world, has its European Headquarters in Swansea, South Wales. Its programmes reach more than 165,000 security professionals around the world and it operates the internet’s early warning system, the Internet Storm Center.

[sans.org](http://sans.org)

# The future is now.

When world-class tech companies tap into the world-class research that's happening in our universities, everybody wins. **Welsh Government** has a range of funding packages to support industry / academic collaboration projects.

## Information Security Research Group University of South Wales

The university has an international reputation in network security, computer forensics and threat analysis. The group focuses on cyber security and computer forensics, including vehicle telematics, mobile device forensics, hardware analysis, IoT and IIoT, cloud, and the detection and analysis of cyber-based attacks.

The University of South Wales is one of only a few in the UK that carries out network forensics for GCHQ and the UK government.  
[security.research.southwales.ac.uk](http://security.research.southwales.ac.uk)

## Airbus Centre of Excellence in Cyber Security Analytics Cardiff University

This leading academic research unit for cyber security analytics was co-founded by Cardiff University and Airbus in 2017. It focuses on the interpretation and effective communication of applied data science and artificial intelligence methods through interdisciplinary insights into cyber risk, threat intelligence, attack detection and situational awareness.

The first centre of its kind in Europe, it's known as a go-to place for data-science and AI insights on cyber threats — especially in support of the AI sector dealing in UK industrial strategy and the National Cyber Security Centre's (NCSC) focus on Active Cyber Defence.

Cardiff University was awarded NCSC 'Academic Centre of Excellence in Cyber Security Research (ACE-CSR)' status in 2018.  
[cardiff.ac.uk](http://cardiff.ac.uk)

## CHERISH-DE Digital Economy Research Centre Swansea University

The multi-million pound research hub addresses global challenges around cyber security and online safety, delivering digital innovations that help people relate and respond to our rapidly expanding world. There's a focus on health and social care, resource-constrained communities, heritage and cyber security and cyberterrorism. It tackles a wide range of problems, including privacy violations, the drugs trade, sex trafficking, terrorism, disruptive network attacks, and emerging forms of cyber arms.

[swansea.ac.uk/science/computationalfoundry/cherish-de](http://swansea.ac.uk/science/computationalfoundry/cherish-de)

## Data Science Academy (DSA) Cardiff University

Data scientists are in high demand, thanks to their ability to identify better ways of doing complex tasks — from helping doctors diagnose medical conditions more effectively to allowing people to communicate across the globe using instantaneous speech recognition and translation software.

The DSA aims to ensure that Wales produces highly-skilled and employable graduates in some of the fastest growing and in-demand areas, from data science and artificial intelligence to cyber security. It works with industry to expose students to a broad range of techniques for understanding data and use these to apply cutting-edge analytical methodologies to a range of real-world problems.

[cardiff.ac.uk/data-science-academy](http://cardiff.ac.uk/data-science-academy)

## Centre for Artificial Intelligence, Robotics and Human-Machine Systems (IROHMS)

Cardiff University

IROHMS brings together the collective research excellence of three Cardiff University schools: School of Engineering, School of Computer Science and Informatics, and School of Psychology. It explores complex research problems at the intersection of human behaviour and technology, in areas including digital manufacturing and robotics, human factors and cognitive psychology, mobile and social computing, and artificial intelligence.

The centre targets new opportunities emerging within AI, robotics and human-machine systems, developing fundamental and applied knowledge and to train future experts in challenging multidisciplinary areas.

[cardiff.ac.uk](http://cardiff.ac.uk)

## Applied Research in Computing (ARCLAB)

Wrexham Glyndŵr University

ARCLAB specialises in a range of computing and computer science research areas. It's working on research into fields such as networking and security, human computer interaction and affective computing, AI, robotics, IoT and cyber security.

[arclabnet.weebly.com](http://arclabnet.weebly.com)

## AI, Robotics & Data Science Cluster

Cardiff Metropolitan University

The cluster investigates issues around AI, machine learning, big data and robotics. The School is home to the EUREKA Robotics Lab, profiled by the Department of International Trade (DIT) as one of only 14 specialist centres in the UK focused on robotics research, and the only centre specialised in social and service robotics as well as long-term healthcare robotics research and development.

[cardiffmet.ac.uk](http://cardiffmet.ac.uk)

## Centre of Excellence in Mobile and Emerging Technologies (CEMET)

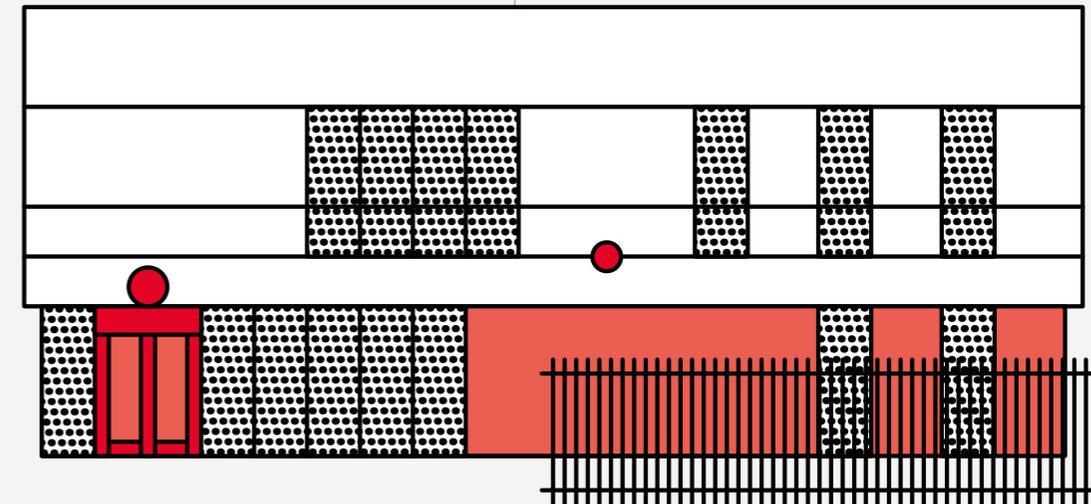
University of South Wales

CEMET supports companies that are seeking to create new products, solutions and services, through bespoke funded collaborative research projects. Specific areas of R&D interest include machine learning and artificial intelligence, support with virtual, augmented or mixed reality, cutting edge data visualisation, assistance with the Internet of Things or other emerging technologies, and creating iOS, Android or cross-platform apps.

[cemet.wales](http://cemet.wales)



*The University of South Wales is one of only a few in the UK that carries out network forensics for GCHQ and the UK government.*



There's a global shortage of cyber security experts — which is why **Cardiff University** and **Airbus** have teamed up to create a Centre of Excellence that is training the young talent who'll keep us safe in the future.

[cardiff.ac.uk](http://cardiff.ac.uk)

# GENERATION NEXT

Degrees of distinction:  
Each year, 3,500 students leave Wales' eight Universities and 16 Further Education colleges with qualifications in ICT.



**F**rom online banking and medical records to power stations and traffic flow, we trust vast swathes of society to computer systems. If they're attacked and they fail, the consequences can be catastrophic.

Fortunately, there's a cyber army out there fighting on our behalf — and Cardiff University's Airbus Centre of Excellence in Cyber Security Analytics is training the next generation of troops. It will be their job to stay one step ahead of the criminals and safeguard the systems we all rely on.

It's work that is becoming ever more important as systems get more complex and automated. Pete Burnap, Professor of Data Science and Cyber Security and director of the £5m centre, says: "Cyber attacks can be very complex and difficult to detect. They can go on without you realising for quite some time, until all of a sudden, everything comes crashing down around you."

As an example, he points to the Stuxnet cyber attacks on nuclear facilities in Iran: "The attackers kept speeding up and slowing down the centrifuges in the uranium enrichment plant, little by little. If the attack hadn't been detected, the whole thing would have collapsed."

Places where universities and companies can come together to turn ideas into real-world solutions are a front line in the war against hackers. For Cardiff University and Airbus, forming a partnership made perfect sense.

Dr Kevin Jones, Group Chief Information Security Officer (CISO) at Airbus, says: "For cyber security monitoring and attack detection, we need an increasing level of automation and analytics. We knew that Cardiff University had a proven track record of excellence in learning and artificial intelligence."

The centre has already chalked up many successes. It was the first institution in Wales to be recognised by the National Cyber Security Centre as an Academic Centre of Excellence in Cyber Security Research. Its academics have published numerous papers in high-impact journals, and it secured £4m to fund its research activities between 2017 and 2021.

This is business as usual for a top research university, but what sets this centre apart is its focus on solving real-world problems and getting the research into commercial outcomes. Through co-location of Cardiff University researchers at Airbus's Newport site — including PhD students, undergraduate interns, and the secondment of Prof Burnap to lead AI for cyber security research — the collaboration has led to innovations in AI-driven malware detection, and goal-oriented risk assessment, being incorporated by Airbus to generate new income streams and protect its own employees.

"We're focused on solving real-world problems and grand challenges," says Prof Burnap. "We're doing a lot around machine learning and artificial intelligence for protection against cyber attacks. AI is very useful in seeking out cyber threats on IT systems, and even automatically blocking them or fixing the situation."

Airbus-funded PhD student Matilda Rhode is working on fighting ransomware, where hackers stop a system working and demand money to get it back up and running. It's not just a theoretical threat: a massive global attack infected computers across 150 countries in May 2017, including parts of Britain's health infrastructure.

It's a fight against a highly motivated enemy: hackers know that the financial rewards can be vast. "Cyber crime is driven by humans, which makes it a very interesting problem," she says. "I definitely want to stay in cyber security research. It's a fast-moving area with a lot going on." Ms Rhode has recently taken up a post as a cyber security research engineer in Airbus' Newport office — evidence of the close collaboration coming to fruition with a strong pipeline of talent.

Surveys suggest that there's a global shortage of cyber security experts. The centre is helping to plug this skills gap, and major expansion is planned over the coming years.

It means that students like Ms Rhode — and the centres of expertise to train them — are needed more than ever. Prof Burnap says: "The more we become dependent on AI, the more we'll need people who can understand the security implications. We want people who can not only build new technologies, but build them so they're secure and safe."

**//**  
*We knew that Cardiff University had a proven track record of excellence in learning and artificial intelligence.*

## M-SParc

Bangor University have built a great workspace for creative minds. M-SParc on Anglesey provides an energising work environment, but also expert knowledge, support, encouragement and investment to succeed.



[m-sparc.com](http://m-sparc.com)

©Richard Chivers

*The world's cyber eyes will be on the new International Convention Centre in Newport in May 2021, as Wales hosts CYBERUK, the UK Government's flagship cyber security event. CYBERUK brings together government, academia and industry while offering unrivalled networking opportunities.*

# CYBERUK 2021

**Summit of success:**  
The International Convention Centre Wales (ICC Wales) is part of the Celtic Manor complex in Newport, which has also hosted a NATO summit and Ryder Cup. It will welcome CYBERUK 2021 11–12 May.

## What is CYBERUK?

Attended by over 2,500 delegates, CYBERUK is the authoritative event for the UK's cyber security community. It demonstrates what we can do together as teams, as departments and as organisations to deliver a digital United Kingdom that leads the world in cyber resilience.

CYBERUK is an opportunity for the cyber security community to meet, discuss business needs, review the changing threat landscape and clarify their responsibilities.

CYBERUK events have a reputation for their energy, informality and ability to break down barriers. Delegates from different sectors have the chance to interact and work together.



*CYBERUK is a great opportunity to bring together experts from around the globe. It's fantastic that we'll be coming together at this great venue to share ideas and insights from across the industry.*

Lindy Cameron  
CEO, National Cyber Security Centre (NCSC)

## Who should attend?

### Strategy & Leadership Community

This event is attended by those with overall responsibility for cyber security in government departments and across central and wider government. There will also be a strong industry presence from across the UK and worldwide.

### Cyber Security Professionals

Attendees will also include technology and cyber security professionals at all levels from across the public sector, Critical National Infrastructure and industry. All those who work in technology, digital security, procurement and data will come together and share the cyber security challenges they all face.

## World-class content, shaped for participants

The National Cyber Security Centre (NCSC) develops an authoritative programme for CYBERUK, with content shaped to the requirements of participants.

Over the course of this event, there are demos, inspirational talks, workshop sessions with world-leading experts and plenty of opportunity for discussion and debate. There are sessions on strategy, governance and the responsibilities facing information risk owners. Technical sessions are provided for technology and cyber security professionals. Further briefings will be relevant for both senior information security leaders and professionals, allowing them to work together and consider problems from different perspectives.

CYBERUK features innovative approaches to security that are making a real difference to the services and infrastructure we rely on.





# LOGICAL CHOICE

For tech security giants **Alert Logic**, the appeal of establishing its European HQ in Cardiff was obvious. It provided the opportunity to develop close ties with the universities of Wales, and the recruitment of its skilled graduates, to meet the growing demands of the business. William Morrish, Vice President & General Manager EMEA, says they had no time to lose.

[alertlogic.com](http://alertlogic.com)

**P**eople are at the centre of what we do. We're a young, very fast-growing business. So when we identified that the universities were producing highly skilled graduates going into careers in IT security and government, we saw that there was an opportunity for businesses like ours to locate here and successfully expand.

Since starting on this journey we have not looked back, thanks to the success we have had in building a highly-skilled and dedicated team in Wales. The team today encompasses a multitude of backgrounds and experience, from doctors of science through to graduates starting their careers at Alert Logic.

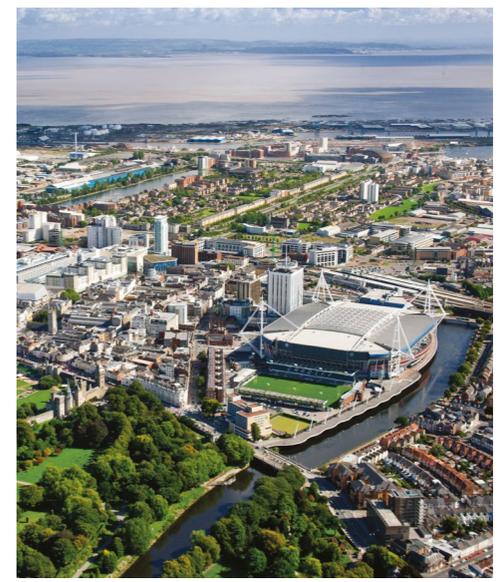
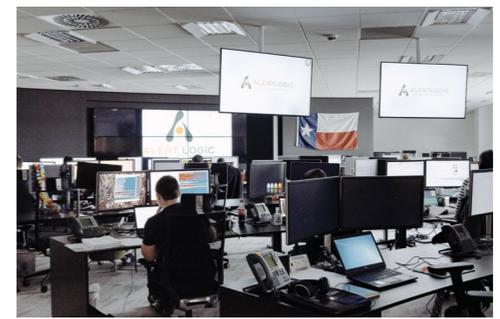
The success we have had in hiring a world-class team in Cardiff has allowed us to accelerate our development plans, and leveraging our relationships with regional universities has been a critical cornerstone in hiring the right sort of talent. This has included developing specific intern programmes, through to working with universities to support the development of their course programmes in order to ensure better alignment with our requirements for skilled graduates.

Finding a central location so that we could take advantage of everything that Cardiff had to offer was also a key consideration. With many of our clients and partners located in the South East of England, having fast, reliable transport links to London has been a major advantage. When compared to other locations that we were considering, Wales is just that much more accessible.

Based upon the four or five other locations we looked at, the first impression as a US-headquartered business, was that the Welsh Government is committed to developing the IT sector. From our first interaction during the selection process, we have found the government very open to understanding our needs and providing help to support the rapid growth of our UK operations.

I think Wales has a tremendous opportunity to continue to attract high-growth IT companies. We'd encourage other companies to come and locate here. The company as a whole has been growing at 40 per cent year on year — more in the UK — and the future looks very positive. And Cardiff is a great, vibrant city with lots to enjoy. It has all the ingredients in terms of talent, location and quality of life to support high-growth businesses like ours.

Some of Cardiff's smartest tech residents are helping to keep millions of people safe around the world. Alert Logic are based in Houston, but chose the 140-acre Central Cardiff Enterprise Zone as their European headquarters.



**ALERT LOGIC**

<b>Location</b>	Cardiff, South Wales
<b>Founded</b>	2014
<b>Employees</b>	150+



## Cyber at the centre of our ambition

Welsh Government launched its new International Strategy in 2020, setting out its international vision for Wales — with cyber security right at its heart. We chose to showcase three distinct industries in which Wales excels and which demonstrate how Wales is a nation committed to creativity, technology and sustainability: **Cyber security, Compound semiconductors and Creative industries.**

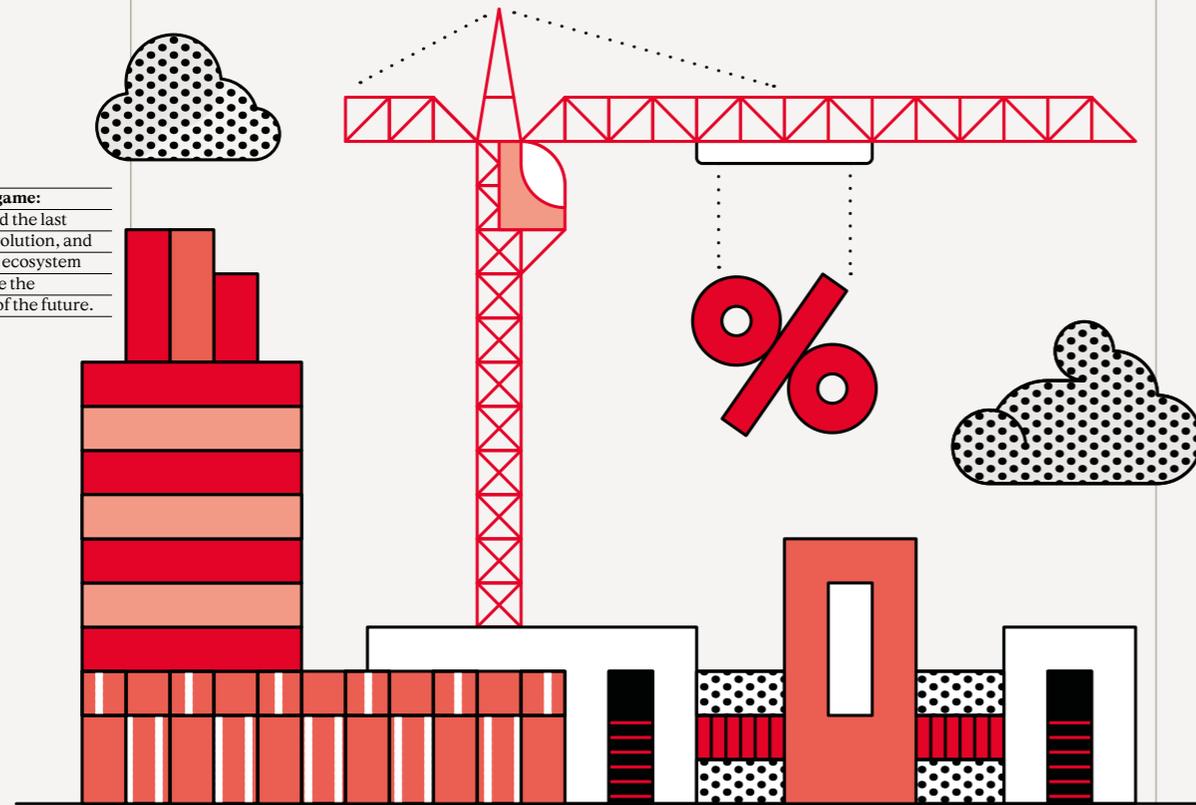
By highlighting the export and investment opportunities in cyber, Welsh Government aims to create new and greater opportunities for people and employment in Wales, and encourage research and development and innovation to sustain present and future generations.

- The three key goals of the International Strategy are to:
- Raise Wales's profile internationally
  - Increase exports and encourage inward investment
  - Show the world what we are doing as a globally responsible nation

# // A platform for growth.

Wales provides a skilled workforce with a broad range of software, engineering and technical expertise across the tech industry and a focus on innovation and collaboration between industry, government and academic institutions.

**Ahead of the game:**  
Wales powered the last Industrial Revolution, and we've built an ecosystem that will create the technologies of the future.



Situated at the western edge of the United Kingdom, Wales is a country that forms part of the UK and has a population of three million people. Geographically, it has a long open border with England, allowing free movement for centuries. Since 1999, the country has had its own devolved government, with control over its own economic development and spending. Wales has a strong track record of attracting diverse international investment and we understand the importance of targeting clients on their home soil, with global offices operating across North America, Europe and Asia. This isn't a new approach for Team Wales; we have been welcoming businesses and helping them grow for decades, with the first Japanese investor arriving over 40 years ago.

Businesses that come to Wales have easy access to the UK market, with its population of 66 million, and to tech clusters in the South West and Manchester regions. But crucially, they have access to a supportive devolved government, which has the ability to make things happen quickly.

Ranging from world-leading innovation in cyber security to pioneering work in compound semiconductors, Wales delivers an infrastructure for technology companies to thrive. Some 40,000 people work in the technology sector, contributing over £8bn a year to the Welsh economy, with thousands more performing technical roles within other sectors.

The UK is the number one destination in Europe for US foreign direct investment — and companies that come to Wales will benefit from operating in a country that has a stable political environment, is English speaking, and business friendly. In addition, the Welsh Government has a dedicated team that looks after investors in the country. Wales can also offer companies a package of support which includes some of the highest funding and financial incentives in the UK.



Wales has the world's first compound semiconductor cluster. The work we're doing on compound semiconductors is central to the global ambition of a trillion connected devices.



3,000+  
ICT COMPANIES  
EMPLOYING  
40,000+ PEOPLE

100+ COMPANIES  
DELIVERING CYBER  
PRODUCTS AND  
SERVICES

3,500 STUDENTS  
EVERY YEAR LEAVE  
OUR 8 UNIVERSITIES  
AND 13 FE COLLEGES  
WITH ICT  
QUALIFICATIONS

TECH NETWORKS,  
HUBS AND  
ACCELERATORS

DEVOLVED  
GOVERNMENT  
GIVES FAST, EASY  
ACCESS TO KEY  
DECISION-MAKERS

COMPETITIVE  
OPERATING COSTS

SUPERFAST  
BROADBAND  
CONNECTIVITY

GREAT ROAD, RAIL  
AND AIR LINKS

A QUARTER OF  
WALES IS NATIONAL  
PARK OR AREA  
OF OUTSTANDING  
NATURAL BEAUTY —  
IT'S A GREAT PLACE  
TO LIVE AND WORK

The Development Bank of Wales, one of the UK's largest regional investment companies, can also make commercial investments in small and medium-sized businesses (SMEs) based in Wales or willing to relocate. The business benefits should be clear. But the lifestyle, and transport links to the UK and the rest of the world, are equally impressive. Cardiff is the vibrant capital city of Wales — and one of the fastest growing cities in the UK, with innovative tech accelerators and incubators such as Tramshed Tech and Alacrity making Cardiff City Region a great place for tech start-ups. It is also just two hours on the train from London. The quality of life in Wales is clear to anyone who has spent a day walking along its coastline, or exploring its mountain ranges.

So, businesses can enjoy the benefits of being close to London without being burdened by the extra costs of being based there. For example, prime office rental prices in Cardiff are very competitive, and significantly lower than average London rates. Salaries are also more competitive in comparison to London and some other regions of the UK.

Businesses in North and Mid Wales are similarly well served by their proximity to the large metropolitan areas and international airports, within the Northern Powerhouse of Birmingham, Liverpool and Manchester. Of course, other areas of the UK will have their own attractions. Areas of England may offer investors good access to decision makers at local authority level. But Wales is a nation, with its own government and a willingness to make things happen quickly.

**What next?**

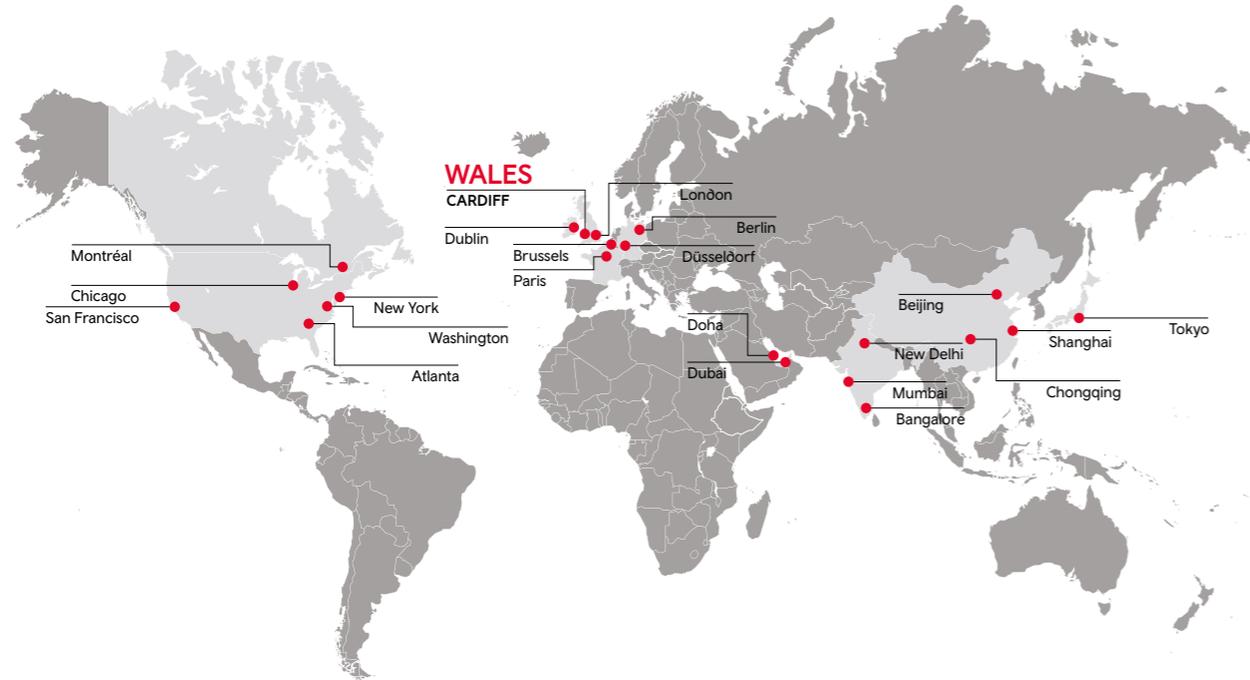
Welsh Government has 21 international offices in 12 countries around the world and they're ready to talk to you about setting up operations in Wales. Our job at the Welsh Government is to make life easier for you. We have been helping companies invest and grow for over 40 years.

From general enquiries to arranging a visit to see what Wales has to offer, we'll connect you with a cyber expert within our team who can help with your exact needs. We get things moving in Wales, as you'll see for yourself just as soon as you get in touch.

**Find out what Wales can do for your business:**

Tel: +44 (0) 3000 603000  
 Web: [tradeandinvest.wales](http://tradeandinvest.wales)

Facebook: [facebook.com/InvestWales](https://facebook.com/InvestWales)  
 Instagram: @InvestWales  
 Twitter: @InvestWales  
 LinkedIn: [linkedin.com/showcase/trade-&-invest-wales](https://linkedin.com/showcase/trade-&-invest-wales)



**Key industries in Wales:**  
 We're focusing our energy on the things we do best. These are our eight strongest sectors, with the greatest opportunities for growth.



Advanced Materials & Manufacturing



Creative Industries



Energy & Environment



Financial & Professional Services



Food & Drink



Life Sciences



Tech



Tourism

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*Wales is a leading hub in our fast-growing cyber security sector, with cutting-edge firms and strong investment figures, as well as being home to some of the UK's top academic institutions.*

Matt Warman

UK Government Minister for Digital Infrastructure