Trends Shaping the London Tech Scene

Andy Oram

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by Andy Oram

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Figure 1-1. London does have unicorns

Finance, journalism, trade, the arts, government—London has been known as a world leader in these areas for centuries. Computer technology doesn't arouse such an immediate association with London, but since the mid-2000s it has steadily taken hold in all those

areas of London activity and has created a vibrant, independent business environment of its own. While not as "hot" as Silicon Valley (no Facebooks or Apples have been launched in London, and few unicorns), London's tech scene obeys its own "slow and steady" growth model.

This report aims to be a comprehensive view of the computer technology scene in London: where it stands, some of its origins, who's participating in it, and what feeds its strengths.

I happen to be examining the phenomenon of computer technology in London at an odd moment, because many people attribute its robustness to Britain's presence in the European Union. The British have notoriously just come away from a historic vote that, over the next few years, will undo that relationship, while trying to maintain as close a business and cultural connection to the Continent as possible. Although this report does not examine politics or take on the dicey task of predicting the impact of the Brexit, we will examine London's ties to the continent and the impact of these ties on the tech scene.

Highly Skilled Staff—Where Do They Come From?

London's highly international workforce benefits from fine universities in Britain and across the continent. But they also take learning into their own hands, creating numerous free and paid forums for computer training.

London is a whirlpool that sweeps in programmers and data scientists not only from all over Great Britain but also from Europe, the British Commonwealth, and the rest of the world. Given the shortage of qualified technical staff worldwide, it's salient to consider how people get these skills. In particular, British universities are an excellent source of data scientists. It's hardly necessary to remind readers that British mathematicians stood at the very dawn of the computer field. These include not just Alan Turing, but also such people as the creators of EDSAC, claimed to be "the first *practical* general purpose stored program electronic computer", at Cambridge University in 1949.

An Education Cornucopia

Yodit Stanton, the head of OpenSensors.io, suggests that more recently, British universities picked up the need for more data scientists from England's strong financial sector, one of the earliest fields to recognise the critical importance of such skills. Now, she says, London is one of the best places to get quant skills, making it easier to build a data-focused business.

London also benefits from the fine universities across Europe, many of them free to attend. It's generally easy for educated people from any country to move to London, because they learn English as part of their training. Although there is some diversity in the tech field, it does not reflect the diversity of London itself. Technology staff tend to come from other parts of Europe, rather than Asia or Africa.

Most of the technologists I talked to thought the Brexit would have minimal impact on London's appeal for foreign computer experts, but some foreigners are seriously reconsidering their choice to live there. What I am hearing extends beyond dry calculations concerning the Brexit's financial impacts on the computer field, and enters into a kind of grief over the newly revealed, less welcoming atmosphere shown by the vote, particularly as that atmosphere might affect them and their family members.

Close to Home

Once in London, technologists need to learn new skills. According to Simon Wardley, a researcher for the Leading Edge Forum in areas of competition and strategy, many people used to satisfy their need for ongoing education through the Open University. However, increases in that institution's fees have led some job hunters to consider it prohibitively expensive.

Luckily, educational opportunities of all types have risen to address the pressing need for computer science education. *The Guardian,* a leading newspaper, printed an article listing just a few of these opportunities, which include many that will be familiar to programmers outside the UK and others that are UK-specific. Some are for adults, some for children. Some are held online and others face-to-face.

According to Martijn Verburg—CEO of jClarity, as well as co-leader of the London Java Community (LJC) and the London CTO com-

munity—coding bootcamps train people over periods of up to three months, showing the depth of learning. More than one of my correspondents highlighted Skills Matter, which offers meet-ups, formal lectures, and online videos of earlier lectures. Henry Garner mentioned Makers Academy, a bootcamp-like environment for learning to become a full stack developer with a focus on Ruby on Rails and JavaScript. He said that around 30% of its graduates are female, an important achievement in a coding culture that is still male-dominated. He also praised Codebar.io, a non-profit that brings in volunteers to provide accessible learning opportunities via evening sessions that draw 20 to 50 attendees. And techmums offers workshops in digital technologies to mothers.

Meetups are also well-attended in London, a phenomenon we'll look at in the next section.

Pitching In

London tech players eagerly pursue networking opportunities. Each community holds numerous meetups each month, and there's also cross-pollination between communities.

The previous section mentioned the generosity shown by expert programmers who volunteer for Codebar.io. Other volunteer groups marshal programmers and data scientists to aid social causes. For instance, DataKind signs up data scientists to do pro bono work for charities.

Like many cities, London has a rich meetup culture. Its size allows a proliferation of events on the same topic. Some of my correspondents reported that many people attend meetups just for networking purposes (particularly contractors who change jobs frequently), but it appears that many meetups involve authentic learning and community building. Popular sessions can draw 80 people. Verburg points out that meetups cross-promote speakers and events, such as when the co-lead of the Java meetup keynoted at the London PHP conference a few years ago.

One of the earliest meetups, according to Verburg, was the London Java Community, which now boasts 5,500 members and claims a significant impact on the global Java community. In addition to hosting its own event almost every week, the London Java Community has spun off several related groups, including Groovy, Clojure, Scala, JBoss, Docklands, CTOs, Graduate Developers, and Front

End developers. Verburg also links the London Java Community to the Software Craftsmanship meetup.

Python programmer Nic Tollervey says that a typical month in the Python community includes a general meetup with traditional talks, a Coding Dojo (social programming for all levels of experience, now in its eighth year), a PyLadies chapter, a PyDataLondon gathering (which regularly attracts 200+ people to meetings), a Django User Group London (DJUGL) meeting, a Python Project Night (designed for people to collaborate on "side projects"), and some special interest groups such as Python in fin-tech meeting in the financial district. Teachers and developers often meet to share experience and knowledge, demonstrating the dedication that busy people in the tech community show in volunteering their time.

Lorna Mitchell, a tech lead who is currently a developer advocate at IBM, reports similarly rich offerings for PHP developers. In addition to PHP meetups, there are meetings devoted to Drupal, WordPress, and frameworks built on PHP—something every night of the week.

Popular meetups can schedule the same presentation in different parts of town on different evenings, making travel easier for people in those districts. Several meetups focus on women, such as Django Girls and the aforementioned PyLadies. Stanton runs a "Women in Data" meetup with more than 1,000 members.

Setting Up Shop

> *The startup scene is very fertile in London, and to some extent in many parts of the UK. But entrepreneurs have to get creative with funding, because risk-taking is still less common than in the US, and money doesn't flow at the same volumes in the UK. Employee retention can also be difficult, as well-trained staff constantly seek better jobs.*

People outside Britain tend to be unaware of British successes in the computer business. For example, people don't necessarily associate the well-known chip manufacturer ARM, whose products can be found throughout the embedded industry, with the UK, despite its being headquartered in Cambridge (though it was recently bought by a Japanese company).

Embedded Technology

Much of the glow of London's technology scene remains hidden because it serves the many other sectors of the economy, such as the financial district, rather than spawning standalone computer companies like Twitter. Simon Wardley points out that local tech companies provide online services in real estate, small business lending, overseas money transfer, and music (Shazam in particular). Food delivery services, which have websites that accept orders, are also much more popular here than in the US. Tollervey points out that Bank of America employs thousands of Python developers in London. And large multinational computer firms have opened London centres, such as Google (nicely settled in a building painted in outrageous orange and green) and Facebook. (We will examine the strategy of attracting such large firms in the section on government later in this report.) UK-based firms tend to get acquired before they get large on their own; a well-known example being Google's 2014 purchase of the artificial intelligence firm DeepMind.

Punctuated Evolution

Several of my correspondents traced the history of tech opportunities, mentioning a crisis in employment for programmers during the dot-com bust of the early 2000s. Technologist Simon Wistow notes that lots of people who lost their start-ups at that time took refuge in the media. The BBC in particular used this opportunity to launch innovative, integrated online sites. (The BBC is insulated from business trends because it is funded by a tax on the owners of television sets.) James Duncan, who has moved between private and government tech work, says that the BBC innovations, historic though they may be, stayed locked within the BBC—much of what its tech employees learned did not enter general practice until they took other jobs. *The Guardian* has also, more recently, championed innovation in media.

According to James Governor, a co-founder of RedMonk who now runs the co-working space Shoreditch Works, the infrastructure for a vibrant culture of innovation in computers wasn't yet present in the early 2000s. It has come together over time through the growth of funding, incubators, and other elements of a healthy tech economy.

Duncan sees a key difference between US's Silicon Valley and London: Silicon Valley *produces* core technology, such as database engines, whereas London *consumes* these technologies and produces end products, such as the online companies mentioned earlier.

On the start-up end of the business range, London has many promising companies breaking new ground in technologies on the early side of the hype cycle. Tollervey cited blockchains and cryptocurrencies (which the traditional financial sector has funded generously), green energy marketplaces, 3D printing, and the Internet of Things. Wardley sees interest and advances across the UK in robotics, virtual reality, augmented reality, genetic engineering, biomanufacturing, and artificial intelligence.

Made of Money

The business models and growth strategies for London-based tech companies are tied to funding opportunities, which most technologists find to be less available than in the US. Each stage of funding has its own challenges and opportunities. There is a widespread sense that London (for all its financial heft) has fewer venture capitalists than San Francisco or New York. But consulting firm owner Francesco Cesarini, citing a recent VC forum, calls these impressions into doubt and claims that VC funds in the UK are only a bit smaller than what's available in Silicon Valley. In the UK, however, sale prices for companies tend to be smaller at exits (sales by founders) and there are fewer unicorns.

Some correspondents have noticed that old English families are putting their money into computer companies, so that as Governor puts it, "investment is getting increasingly posh". This is nothing new in British history. Even in the 1600s, landed aristocracy grew interested in the burgeoning trade, and later they funded the mines and factories of the Industrial Revolution. There was less of a contentious gap between the landowning class and the bourgeoisie in Great Britain than in other parts of Europe.

Many people therefore tap friends and family to start a business; crowdfunding has also been used. Nuno Job, who moved to London after a career in San Francisco and runs a consultancy firm, suggests that the lower intensity of business activity in London makes it easier to succeed than in the Silicon Valley.

Some of my correspondents said that technological advances, notably the availability of cloud computing, has made starting a computer-based business much cheaper and easier. Money that used to go to networking equipment, servers, and expensive software such as commercial databases can now go toward staff salaries. Governor pointed out that the London tech scene really kicked off about the time Amazon Web Services become a significant option.

Incubators also play a role. They, too, can take more risks in hosting start-ups because technology costs have eased. Many incubators focus on particular areas such as fin-tech (Canary Wharf is an example) or the Internet of Things. There are also tech fairs around London for people seeking jobs.

Rising Tides

Yodit Stanton pointed out that many businesses are started by "people who don't look like Anglos and don't have Anglo names", but who grew up in Britain, attended the same schools, and share British culture with long-standing English families. As a woman with an African heritage, she decided to ensure her business was self-funding from the start, because she "didn't see many people who look like me" getting VC funding. Her company has, however, won some grants, including one from the EU. That channel, of course, may be closed off when Britain exits the EU.

Tollervey says that some large organisations assemble teams and pay them to act as start-ups. He says they may launch a new product without branding it as their own, see how it fares, and then add their brand if it's successful.

Stage A funding, where entrepreneurs try to raise a million pounds or so, can be harder to get in the UK than initial funding, and Stage B is harder still. At each stage, a bigger investment is called for, and funders are consequently less eager to take on the risk. This phenomenon leads London companies to experience a very different life cycle from that of firms in Silicon Valley. In California, one tends to get big quickly, sell out quickly, or go bust. In London, and perhaps (as suggested by Fran Bennett, chief of Mastodon C) in Europe generally, companies stay small for a longer period of time. They choose what Stanton calls "organic growth" over "steroid growth". I sense that British investors would not consider a company to be failing if it reported 20% growth in revenue over the previous year.

Slow growth has also been blamed on risk-averse funders. Failing fast is not viewed positively. Martijn Verburg traces funding constraints to laws and regulations for company directors that are stricter in the UK than in the US, and that emphasise fiduciary duties that make failure a significant liability. Duncan says that businesses leave core research up to universities and invest in projects with immediate, recognisable benefits. He says there is no "garage culture" in the UK, and researchers wouldn't drop out of university to found a company as they do in the US. Furthermore, some correspondents struck a dubious attitude toward university computer science training, saying that graduates emerge unable to produce code in real-world environments.

On the other hand, several of my correspondents have seen more willingness to take on risk since the late 2000s. This period also saw the advent of viable cloud computing, and heightened UK government interest in technology, as mentioned elsewhere in this report.

Borough Markets

As in other cities, certain parts of London get associated with particular types of computer technology: the City (a name that still sticks to the oldest part of London) for fin-tech, Shoreditch for start-ups, Richmond for larger companies. Bennett locates technology for media, advertising, and fashion in West London (because those industries were historically located there).

One central traffic circle is known as the Silicon Roundabout because of the many start-ups clustering around it. The term began as a joke that was picked up by newspapers. At one point the government considered actually building a campus in that roundabout, but that plan fizzled out. (I consider that just as well, because standalone campuses tend to shut out innovation rather than spread it. The government might as well invite entrepreneurs to set up office in the Tower.)

Also as in other cities, the computer field has to flee from its own success, which takes the form of rapidly rising rents. Shoreditch, east of the centre of London, used to be attractive for scrappy new companies, but has recently gotten too popular. Governor says that Shoreditch rents have tripled over the past three to four years, and Verburg's company actually closed its Shoreditch office. Many of the experimenters are being driven even farther east. The periphery of

London, especially the part close to Gatwick Airport, also picks up companies seeking lower rents. The head of a small office in South-wark, a popular area on the south bank of the Thames, told me her office would have to move because their rent just doubled. And as I walked the streets of downtown London, I saw building cranes everywhere.

Many co-working spaces are available. Programmer Konrad Malaw-ski says that Google has a co-working space that offers learning pro-grams. However, Lorna Mitchell believes that most London technologists commute to their organisations' offices. She says, "No one would live in London if they could telecommute, because the cost of living is so high."

Finding a Good Fit

My correspondents disagreed on how much churn businesses suffer from. Nuno Job finds that people move from one start-up to another every 9 to 12 months, making it hard for companies to get the stabil-ity they need. Others believe that turnover is less frenzied than in San Francisco. Marco Iannone, a data scientist who started the firm Retechnica in 2012 with a specialisation in text analytics, calls hiring and retention the hardest part of running a tech business.

Skills are tight in every technical area: all kinds of programming as well as design. Four to five years of experience are enough to launch a career as a consultant, which many employees do because it gives them more control over their locations and hours of work. Thus, Iannone says, a business has to offer employees and contractors compelling reasons to work for it. London is still the place to be, he says, because most firms have large offices there even if they're not headquartered there, and meeting face-to-face with Chiefs of Inno-vation or other client managers is invaluable.

Data scientists, according to Iannone, get to write their own ticket because all hiring organisations have to compete for people in that field with well-funded businesses in finance, advertising, and media. Some data scientists, however, choose to work in smaller, more innovative firms in order to gain more control over their projects.

Most firms hiring data scientists don't have managers who under-stand the field themselves, so they assign a high importance to get-ting a PhD and attending a famous university. Iannone takes a different approach, looking for a curiosity about the type of business

where the data scientist is working. The scientist must learn the domain she's working in and how to interact with the business people in the organisation. He has seen that if this doesn't happen, the data science and business sides of the organisation stop working together. Each side ends up feeling that the other doesn't appreciate it, and after a couple years the data scientist heads off looking for a new position.

Simon Wardley notes that the UK lags behind other developed areas of the world in Internet bandwidth. In some assessments, the historic British Telecom company still has an effective monopoly over broadband. Many parts of the UK have upgraded to fiber-to-the-cabinet, which is less aggressive than fiber-to-the-home and leaves a lot of slow copper wire along the "last mile". In other parts of the UK, community-driven efforts in the North and South provide high-speed fiber-to-the-home.

Government: We're Here to Help You

Over the past five or six years, the national government has taken a strong role in promoting technology. In addition to offering tax breaks and incentives for companies to open UK offices, they have embarked on a digital transformation of government itself.

British governments have cultivated the UK's tech sector with alacrity. In government itself, the Government Digital Service (GDS) has taken on a number of projects, eschewing the worldwide laziness that leads governments to hand projects over to contractors and provide insufficient technical oversight. Initiatives comparable to the GDS in other countries include 18F in the US and Red Gealc (Network of Electronic Government of Latin America and the Caribbean).

A Slow Unfolding

Around 2010, a number of papers were published that called for reforming software practices in government. According to Simon Wistow, the GDS was based on one such paper. They recruited high-quality candidates from the start-up community and (unlike the civil service in general) paid them salaries comparable to what they could get in the private sector. By putting the staff in a high pay grade, the GDS endowed them with the prestige to get civil servants throughout the government to do what they asked.

Some of GDS's achievements include revamping the Gov.uk website, setting up a site called G-Cloud that provides cheap computing to public sector organisations (and subsequently shutting down some data centres, thus saving money), making it easier for small companies to compete for government contracts and providing better sites for citizens to register cars, pay taxes, apply for passports, register to vote, and even vote remotely. Along the way, GDS showed the value of iterating quickly to produce products.

Many GDS staff are restricted to two-year contracts, both to bring in fresh ideas regularly and to produce alumni of the GDS who can promote it throughout the computer community. Wistow spoke of a "revolving door between the tech start-up community and the GDS." He also says that technologists in the UK are more drawn to political activity and civic participation than their Silicon Valley counterparts. The libertarian ethos so widespread in the Silicon Valley is absent here.

Duncan, who works in the Home Office, is helping them make a similar transition to doing more work in-house. He says, "We had to change everything in government to make that work." Formerly, the people responsible for technology in government were accountants and procurement people. So the first change Duncan's group made was to put in place senior leadership who understood technology and what it could do. They also compelled departments to adopt open standards such as the Open Document Format. Duncan says that the UK government can claim credit for Microsoft's decision to support ODF in its Office suite.

Software reuse, which would be an obvious benefit of government development efforts, was also hard to promote. Duncan says that, traditionally, government agencies didn't even know what software they had. They don't reuse software even if two departments have contracts with the same vendor. Still, there is progress in doing software in-house. Duncan says that despite low pay in most government offices, "many of the smartest and hardest-working people I know are in the civil service."

London is also exploring smart city technologies. Bennett's company, Mastodon C, is prototyping tools that let them predict the ripple effects of a large housing project or of decreased funding in some area. A special issue of Centre for London essays on technology includes an article on open data and visualisations for the city.

In addition to serving as a role model, the UK government promotes technology through tax breaks. The UK makes it lucrative to sell a company. The capital gains tax was recently reduced. Qualifying types of R&D also get tax breaks, and the Seed Enterprise Investment Scheme (SEIS) allows investors who invest up to £100,000 to claim 50% tax relief.

Direct investment by government is less common, but Tech City UK includes a range of stimuli. According to Governor, these efforts succeeded in London—particularly in attracting large companies such as Google—but didn't work in the North, despite efforts by a Tory administration to expand Tech City there (probably hoping to win the hearts of the working-class Labour voters from smokestack industries). Wardley believes that a technology push by the Conservative-Liberal coalition elected in 2010 helped London a great deal.

Life in London

Like many of the world's leading cities, London suffers from a high cost of living and difficulties with housing. Yet to many, it is the best—or even the only—place to build a computer career and a business.

Technology plays a role in the London arts scene just as it does in other fields. Anthony Mann, a programmer who worked in both music software and digital art, says that projects in computer-generated art are widespread. Hack spaces feature groups around sound and audio-visual presentations. Interactive installations use sensors to reflect viewers' moods and behavior. Galleries display these projects, and sometimes the press reviews them. Yet they maintain a certain distance from the technologically driven art: for instance, such displays are advertised as "digital art" instead of just "art", in the same way that music by female composers used to be programmed in special concerts of "women's music". It's also hard to make money doing digital art.

Mainstreaming

Exhibits in the Victoria & Albert Museum show some of the high-tech art going on in London. A canopy called Elytra is being created incrementally in the museum's garden by a robot, based on the daily movements of visitors to the museum, as recorded by sensors. 3D-printed furniture is also part of the permanent exhibit.
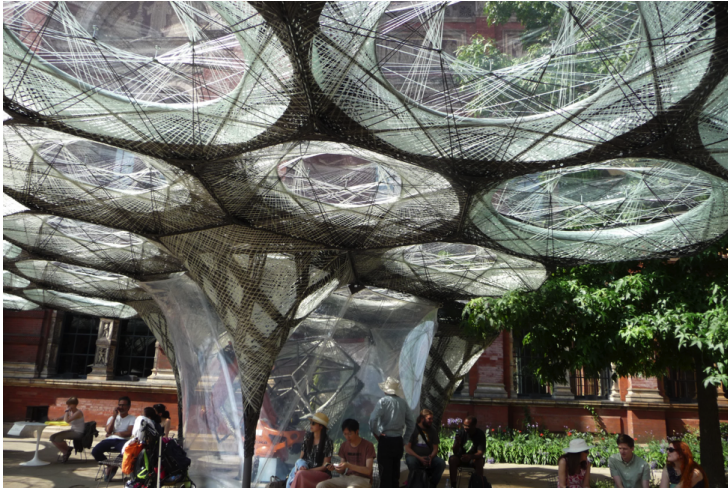
Figure 1-2. In the shadow of a canopy designed and built by a robot at the Victoria & Albert Museum

Figure 1-3. Make beautiful 3D-printed furniture and it may end up in the Victoria & Albert Museum's permanent collection

Who Will Pay the Rent?

Everyone I talked to complained about the stresses of London, notably high costs and long commutes. The quality of life is high, and everyone appreciates such British benefits as the National Health Service and parental leave. But European and British salaries are

lower than in the US, and the city is oriented around the stock traders, not the middle class. The London tube cars are replete with ads one finds in places with superheated economies: ads for services that come to your home and do everything from clean to give you a massage. These should be accompanied by a warning: "Mind the income gap."

One study found that London is much cheaper to live in than New York, while another rated them about the same. Either way, London has to be one of the world's most costly places to live. Duncan goes so far as to say that it's "almost impossible" to survive as a tech person in London.

Typical train commutes are 50 minutes one way, and one-way commutes of two hours or more have been reported. But Fran Bennett says that some companies are experimenting with flexible hours to make family life easier.

Owning a home in London is beyond most people's means. Berlin has been cited as a city of comparable appeal with a much easier real estate market.

Yet people still flock to London. Duncan cites "a sense that the rest of the UK is irrelevant". Start-up scenes do exist in other cities—including Birmingham, Brighton, Manchester, and towns along the M4 highway—but they're nowhere near as robust as London's.

London's diversity, of which residents are proud, isn't likely to diminish. On a recent visit, as I listened to people on streets and buses, I heard foreign languages as often as English.

Foggy Predictions

No one can predict what the Brexit will do to London's tech scene. Many speculate that fewer technologists will move there and that a financial downturn will make success harder. Lorries (funded by some German entity) are going around with loudspeakers encouraging people to move to Berlin. Governor says, "The UK used to *be* the bridge to the continent, but now it *needs* a bridge to the continent." In contrast to that prevailing pessimism, Wardley stresses that the UK remains especially friendly to technology. Its government has often tangled with the European Commission to insist on royalty-free licensing in open standards (a major plank of the free and open source software movement), to oppose unwarranted regulations that

hamper Internet services, and to slow down attempts at premature standardisation in emerging markets. The nation still benefits from a history of global trade, democracy, immigration, and multiculturalism that existed long before the political institution that is the European Union.

Certainly, while the EU remains a huge market, its own economies aren't exactly dynamos at the moment (although the irony is not lost on me that the Brexit vote played some role in the most recent downturn).

At a far-ranging panel on technology held right after the Brexit vote, entrepreneurs and venture capitalists showed their stiff upper lips and tried to take a "can do" attitude. (It's unfortunate that, in the recording of that panel discussion, many of the speakers cannot be heard because of problems with the sound recording.) They agreed that leaving the EU was bad for business, but urged technologists to look for opportunities just as in any downturn.

London is unlikely to split from the UK (unless climate change brings the Channel right up to the banks of the Thames), but the city will continue to hold a central place in the hearts of British and foreign computer professionals, as it does the world as a whole.

About the Author

Andy Oram is an editor at O'Reilly Media. An employee of the company since 1992, Andy currently specializes in programming topics. His work for O'Reilly includes the first books ever published commercially in the United States on Linux, and the 2001 title *Peer-to-Peer*.