FOR IMMEDIATE RELEASE

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772-234-2787

NOTE: This news release is a summary extract of content in the Q2 2018 update of Foote Partners’ IT Skills Demand and Pay Trends Report, a market intelligence trend report updated every 3 months from data contributed by 3,188 U.S. and Canadian employers and contains tech jobs and skills compensation and supply/demand benchmark research published in the firm’s IT Professional Salary Survey and IT Skills and Certifications Pay Index™.

Average market value for 451 IT certifications rose for a second straight quarter following four consecutive quarterly losses. Non-certified tech skills also gained in average value during the first quarter of 2018, led by increases across nearly all skills categories.

With the tech unemployment rate a low 1.9%, market value volatility for tech skills smoothing out after nearly a decade of instability, and the constant frenzy surrounding short term skills gaps quieting down, where should employers turn their attention now? To something more urgent and potentially catastrophic in the near future.

Vero Beach, FL – June 8, 2018 - Extra pay awarded by employers to talented IT professionals for 522 noncertified tech related skills---also known as skills pay premiums and currently averaging the equivalent of 9.3% of base salary for a single noncertified skill---increased 1.2% in the first quarter of 2018. Average market value for 446 IT certifications rose for the second straight quarter, up a slight 0.3% overall, following four consecutive quarterly losses. Currently earning the equivalent of 7.6% of base salary on average for a single certification, gains were led by Info/Cybersecurity, Database, and Architecture/Project Management/Process certifications.

This according to the latest quarterly update of Foote Partners’ IT Skills and Certifications Pay Index™ (ITSCPI) based on compensation data provided by 3,188 North American private and public-sector employers who partner with the firm to report pay for their 282,660 IT professionals in the U.S. and Canada.

Since its launch in 1999, the IT Skills and Certifications Pay Index™ has continuously tracked quarterly market values for individual IT skills and certifications earned by 74,644 tech professionals at 3,188 employers in 83 U.S. and Canadian cities. Rigorously validated data and detailed market analyses are updated and published by Foote Partners every 90 days.
Pay Performance, 3/12/24/24/36 months
Certified vs. Noncertified IT Skills

(74,664 IT professionals, data through 4/1/2018)

Figure 1

3 Yr Growth/Decline in Pay Premiums for 981 Tech Skills and Certifications

% of Change in Market Value (through 4/1/2018)

0.0% 0.3% 0.6% 0.7% 1.2% -0.1%

451 IT certifications
530 Noncertified IT skills
All 981 Skills and Certifications

Source: Foote Partners, IT Skills and Certifications Pay Index™ (1Q2015 – 1Q2018 editions)
HIGHLIGHTS: Quarterly and Annual Results – Through April 1, 2018

A. IT Skills and Certifications Pay Performance: By Category

NONCERTIFIED IT SKILLS. Cash pay premiums for 530 noncertified skills increased during the first quarter of 2018, gaining an average of 1.2% in market value. Pay performance was higher across nearly all eight noncertified skills categories reported. Pay performance over the past 12 months has also been strong but in a different ranking among categories:

Noncertified Tech Skills - % Growth/Decline
3 months & 12 months

Figure 2

(530 skills, data through 4/1/2018)
NONCERTIFIED IT SKILLS TREND HIGHLIGHTS: Market Value Gainers

These noncertified IT skills gained 10% or more in market value in the six months ending April 1, 2018 vs. prior quarter (by segment). Listed in descending order of amount of % gain and cash pay premium (including ties).

<table>
<thead>
<tr>
<th>Applications Development skills</th>
<th>Operating Systems/Systems Software Skills</th>
<th>SAP/ERP skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerner Millennium</td>
<td>HPUX</td>
<td>SAP NWDS (NetWeaver Studio)</td>
</tr>
<tr>
<td>Integration Testing</td>
<td>Solaris</td>
<td>SAP Oil &amp; Gas</td>
</tr>
<tr>
<td>Ruby on Rails</td>
<td>CoreOS</td>
<td>SAP BOXI (Business Objects XI aka Crystal Reports)</td>
</tr>
<tr>
<td>Apache Zookeeper</td>
<td>OpenStack</td>
<td>SAP Business Workflow/Webflow</td>
</tr>
<tr>
<td>Drupal</td>
<td></td>
<td>SAP MII (Manufacturing Integration and Intelligence)</td>
</tr>
<tr>
<td>GitLab</td>
<td>Web/SOA/E-Commerce skills</td>
<td>SAP PSCD (Collection/Disbursement)</td>
</tr>
<tr>
<td>MATLAB</td>
<td>Magnolia</td>
<td>SAP FI - CA (Contract Accounting)</td>
</tr>
<tr>
<td>Microsoft Azure</td>
<td>Javafx</td>
<td>SAP WEBI (BusinessObjects Web Intelligence)</td>
</tr>
<tr>
<td>Eclipse</td>
<td>Magento</td>
<td>SAP SRM (Supplier Relationship Management)</td>
</tr>
<tr>
<td>Apache Ant</td>
<td>Joomla!</td>
<td>SAP CAR (Cust. Activity Repository)</td>
</tr>
<tr>
<td>NetWeaver</td>
<td>ColdFusion/ColdFusion MX</td>
<td>Microsoft Dynamics</td>
</tr>
<tr>
<td>JUnit</td>
<td>Sitecore CMS</td>
<td>SAP MM (Materials Management)</td>
</tr>
<tr>
<td></td>
<td>WSDL (Web Services Description Language)</td>
<td>WebDynapro</td>
</tr>
<tr>
<td></td>
<td>WebSphere Datapower</td>
<td>SAP SM (Service Management)</td>
</tr>
<tr>
<td>Database Skills</td>
<td>Redux</td>
<td>SAP PLM (Product Lifecycle Management)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAP PS (Project Systems)</td>
</tr>
<tr>
<td></td>
<td>Systems/Networking skills</td>
<td>SAP FI - FSCM (Financial Supply Chain Management)</td>
</tr>
<tr>
<td></td>
<td>Microsoft SCVMM</td>
<td>SAP Exchange Infrastructure (XI)</td>
</tr>
<tr>
<td></td>
<td>Cisco CUCM</td>
<td>SAP for Retail (IS-Retail)</td>
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<tr>
<td></td>
<td>Cisco UCCE</td>
<td>Oracle SOA Suite</td>
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<tr>
<td></td>
<td>Cisco UCCX</td>
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<td></td>
<td>Network security management</td>
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<td></td>
<td>Cisco IPCC</td>
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<tr>
<td></td>
<td>Vagrant</td>
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<tr>
<td></td>
<td>SolarWinds</td>
<td></td>
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<tr>
<td></td>
<td>Cisco Nexus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IaaS (Infrastructure as a Service)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PaaS</td>
<td></td>
</tr>
</tbody>
</table>

Source: Foote Partners IT Skills & Certifications Pay Index™, 1st Quarter 2018 data

Highest Paying – Cash Premiums

- Data Architecture
- Security architecture and models
- Complex Event Processing/Event Correlation
- TIBCO ActiveMatrix BusinessWorks
- TOGAF (Enterprise Architecture)
- Machine Learning
- Prescriptive Analytics
- Apache Zookeeper
- Risk analytics/assessment
- COBIT
- Apache Hive
- Blockchain
- Cloud Foundry PaaS
- Cybersecurity
- Data Governance
- DevOps
- Ethereum
- Hbase
- Metadata design and development
- Microservices
- Objective Caml (Ocaml)
- Oracle Coherence
- Predictive Analytics and Modeling
- Risk management
- Security skills (DW/BI, ERP, Web, project assignments)
### NONCERTIFIED IT SKILLS TREND HIGHLIGHTS: Market Value Losers

These noncertified IT skills **declined 10% or more in market value** in the six months ending April 1, 2018 (by segment). Listed in **descending order of amount of % decline**, including ties.

<table>
<thead>
<tr>
<th>Applications Development skills</th>
<th>SAP &amp; Enterprise Business Applications skills</th>
<th>Systems/Networking skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>iRise</td>
<td>SAP MDM (Master Data Management)</td>
<td>Storage virtualization/administration</td>
</tr>
<tr>
<td>Visual C++</td>
<td>SAP AFS (Apparel and Footwear Solutions)</td>
<td>Cisco ICM</td>
</tr>
<tr>
<td>Java SE/Java EE</td>
<td>Oracle Eloqua</td>
<td>vCloud</td>
</tr>
<tr>
<td>Apache Lucene</td>
<td>SAP MDG (Master Data Governance)</td>
<td>Cisco ISE (Identity Services Engine)</td>
</tr>
<tr>
<td>Google Kubernetes</td>
<td>Oracle CRM (Customer Relationship Management)</td>
<td>Routing (e.g. OSPF, RIP, IGRP)</td>
</tr>
<tr>
<td>Apache Flex</td>
<td>Oracle Financials</td>
<td>Citrix XenServer</td>
</tr>
<tr>
<td>Cobol</td>
<td>SAP MI (Mobile Infrastructure)</td>
<td>Tivoli</td>
</tr>
<tr>
<td><strong>Management, Process &amp; Methodology</strong></td>
<td></td>
<td><strong>Web/E-commerce Development skills</strong></td>
</tr>
<tr>
<td>Big Data analytics</td>
<td>SAP CS (Customer Service)</td>
<td>Wikis</td>
</tr>
<tr>
<td>Change Management</td>
<td>Oracle SCM (Supply Chain Management)</td>
<td>UDDI (Universal Description, Discovery and Integration)</td>
</tr>
<tr>
<td>Network Architecture</td>
<td>SAP Smart Forms</td>
<td>Google App Engine</td>
</tr>
<tr>
<td>Quantitative Analysis/Regression Analysis</td>
<td>Oracle Payroll</td>
<td>Secure software development</td>
</tr>
<tr>
<td>Metadata design and development</td>
<td>Oracle WM (Warehouse Management)</td>
<td>Mobile applications development</td>
</tr>
<tr>
<td>SEO</td>
<td>Oracle Payroll</td>
<td>HTML5</td>
</tr>
<tr>
<td><strong>Messaging &amp; Communications skills</strong></td>
<td></td>
<td>KnockoutJS</td>
</tr>
<tr>
<td>TIBCO Rendezvous</td>
<td>SAP QM (Quality Management)</td>
<td>XML (all variants)</td>
</tr>
<tr>
<td><strong>Operating Systems skills</strong></td>
<td>Siebel</td>
<td>AngularJS</td>
</tr>
<tr>
<td>Linux</td>
<td>ABAP</td>
<td>JavaBeans/EJB 3.0</td>
</tr>
<tr>
<td></td>
<td>SAP Lumira</td>
<td>RESTful</td>
</tr>
<tr>
<td></td>
<td>SAP HR-PY (Payroll)</td>
<td>Microsoft Internet Security and Acceleration Server (ISA)</td>
</tr>
<tr>
<td></td>
<td><strong>Source:</strong> Foote Partners <em>IT Skills &amp; Certifications Pay Index™</em>, 1st Quarter 2018 data</td>
<td>Microsoft Commerce Server Docker</td>
</tr>
</tbody>
</table>
HIGHLIGHTS – cont’d:

IT CERTIFICATIONS. Cash pay premiums for 451 IT certifications increased +0.3% in the first quarter of 2018 for the second consecutive quarter. Pay performance is mixed with only three of eight categories showing gains. Pay performance over the past 12 months has also been mixed:

![Tech Certifications - % Growth/Decline
3 months & 12 months](image)

(451 certifications, data through 4/1/2018)

Figure 3
IT CERTIFICATION PAY TREND HIGHLIGHTS: Market Value Gainers & Highest Paying

These IT certifications gained 10% or more in market value in the six months ending April 1, 2018 (by segment). Listed in descending order of amount of % gain and cash pay premium (including ties).

<table>
<thead>
<tr>
<th>IT CERTIFICATION Gainers</th>
<th>Highest Paying – Cash Premiums</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application Development/Programming Languages</strong></td>
<td>• Certified Cyber Forensics Professional</td>
</tr>
<tr>
<td>Oracle Certified Professional - Java SE Programmer</td>
<td>• Open Group Master Architect</td>
</tr>
<tr>
<td>Oracle Certified Master - Java SE Developer</td>
<td>• Cybersecurity Forensic Analyst (CSFA)</td>
</tr>
<tr>
<td>Microsoft Certified Solution Developer (MCSD)</td>
<td>• TOGAF 9 Certified</td>
</tr>
<tr>
<td><strong>Architecture, Project Management and Process certifications</strong></td>
<td>• Information Systems Security Architecture Professional (ISSAP)</td>
</tr>
<tr>
<td>Certified Associate in Project Management (CAPM)</td>
<td>• Open Group Master Certified IT Specialist</td>
</tr>
<tr>
<td>Six Sigma Black Belt</td>
<td>• PMI Professional in Business Analysis (PMI-PBA)</td>
</tr>
<tr>
<td>Certified Software Quality Analyst (CSQA)</td>
<td>• PMI Program Management Professional (PgMP)</td>
</tr>
<tr>
<td><strong>Info/Cyber Security certifications</strong></td>
<td>• Six Sigma Master Black Belt</td>
</tr>
<tr>
<td>GIAC Certified Project Manager (GCPM)</td>
<td>• Cisco Certified Architect</td>
</tr>
<tr>
<td>GIAC Systems and Network Auditor (GSNA)</td>
<td>• GIAC Exploit Researcher and Advanced Penetration Tester</td>
</tr>
<tr>
<td>GIAC Exploit Researcher and Advanced Penetration Tester (GWAPT)</td>
<td>• GIAC Web Application Penetration Tester</td>
</tr>
<tr>
<td>GIAC Mobile Device Security Analyst (GMOB)</td>
<td>• Information Systems Security Engineering Professional (ISSSEP)</td>
</tr>
<tr>
<td>GIAC Certified Forensics Examiner (GCFE)</td>
<td>• Information Systems Security Management Professional (ISSMP)</td>
</tr>
<tr>
<td>GIAC Information Security Professional (GISP)</td>
<td>• PMI Portfolio Management Professional (PFMP)</td>
</tr>
<tr>
<td>GIAC Certified Windows Security Administrator (GCWN)</td>
<td>• PMI Risk Management Professional (PMI-RMP)</td>
</tr>
<tr>
<td>GIAC Security Essentials (GSEC)</td>
<td>• Salesforce.com Certified Technical Architect</td>
</tr>
<tr>
<td>Check Point Certified Security Administrator (CCSA)</td>
<td></td>
</tr>
<tr>
<td>GIAC Secure Software Programmer--Java</td>
<td></td>
</tr>
<tr>
<td>EC-Council Licensed Penetration Tester (LPT)</td>
<td></td>
</tr>
<tr>
<td>Check Point Certified Security Expert (CCSE)</td>
<td></td>
</tr>
<tr>
<td><strong>Networking and Communications certifications</strong></td>
<td></td>
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<tr>
<td>Juniper Networks Certified Internet Professional (JNCIP)</td>
<td></td>
</tr>
<tr>
<td>Cisco Certified Network Associate - Data Center</td>
<td></td>
</tr>
<tr>
<td>EMC Storage Administrator - Associate (EMCSA-A)</td>
<td></td>
</tr>
<tr>
<td>Juniper Networks Certified Internet Expert (JNCE)</td>
<td></td>
</tr>
<tr>
<td>EMC Storage Administrator - Specialist (EMCSA-S)</td>
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<tr>
<td>EMC Storage Administrator - Expert (EMCSA-E)</td>
<td></td>
</tr>
<tr>
<td>Cisco Certified Design Expert (CCDE)</td>
<td></td>
</tr>
<tr>
<td><strong>Systems Administration certifications</strong></td>
<td></td>
</tr>
<tr>
<td>HP Accredited Integration Specialist (AIS)</td>
<td></td>
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<tr>
<td>CompTIA Server+</td>
<td></td>
</tr>
<tr>
<td>NetApp Certified Data Administrator, ONTAP (NCDA)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Foote Partners IT Skills & Certifications Pay Index™, 1st Quarter 2018 data
**IT CERTIFICATION PAY TREND HIGHLIGHTS: Market Value Losers**

These IT certifications *declined 10% or more in market value* in the six months ending April 1, 2018 vs. prior quarter (by segment). Listed in *descending order of amount of % decline*, including ties.

<table>
<thead>
<tr>
<th>IT CERTIFICATIONS Losers</th>
<th>Systems Administration certifications</th>
<th>Networking &amp; Communication certifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Architecture, Project Management, and Process Certifications</strong></td>
<td>HP Accredited Technical Professional (ATP - all)</td>
<td>Juniper Networks Certified Internet Specialist (JNCIS)</td>
</tr>
<tr>
<td>Six Sigma Master Black Belt</td>
<td>RedHat Certified Specialist in Virtualization</td>
<td>CompTIA Network (Network+)</td>
</tr>
<tr>
<td>HP ASE Cloud Architect V2</td>
<td>Red Hat Certified System Administrator in Red Hat OpenStack</td>
<td>Cisco Certified Entry Network Technician (CCENT)</td>
</tr>
<tr>
<td><strong>Database certifications</strong></td>
<td>Novell Certified Engineer (CNE)</td>
<td>Cisco Certified Design Associate (CCDA)</td>
</tr>
<tr>
<td>Oracle Certified Associate - DBA (OCA)</td>
<td>RedHat Certified Technician (RHCT)</td>
<td></td>
</tr>
<tr>
<td>Oracle Certified Associate - MySQL 5</td>
<td>Citrix Certified Administrator - Networking (CCA)</td>
<td></td>
</tr>
<tr>
<td><strong>Info/Cyber Security certifications</strong></td>
<td>HP Accredited Solutions Expert (ASE - all)</td>
<td></td>
</tr>
<tr>
<td>Check Point Certified Security Master (CCSM)</td>
<td>Red Hat Certified Systems Administrator (RHCSA)</td>
<td></td>
</tr>
<tr>
<td>EC-Council Certified Incident Handler (ECIH)</td>
<td>HP Master ASE - Storage Solutions Architect V1 /V2</td>
<td></td>
</tr>
<tr>
<td>GIAC Certified Forensics Analyst (GCFA)</td>
<td>HP Master Accredited Solutions Expert (MASE - all)</td>
<td></td>
</tr>
<tr>
<td>GIAC Assessing and Auditing Wireless Networks</td>
<td>VMware Certified Advanced Professional (VCAP)</td>
<td></td>
</tr>
<tr>
<td>GIAC Certified Intrusion Analyst (GCIA)</td>
<td>VMware Certified Professional 4/5/6(VCP 4/5/6)</td>
<td></td>
</tr>
<tr>
<td>Certified Secure Software Lifecycle Professional (CSSLP)</td>
<td>Red Hat Certified Engineer(RHCE)</td>
<td></td>
</tr>
<tr>
<td>GIAC Certified Incident Handler (GCIH)</td>
<td>HP ATP - Cloud Administrator V1</td>
<td></td>
</tr>
<tr>
<td>EC-Council Computer Hacking Forensic Investigator (CHFI)</td>
<td>VMware Certified Design Expert (VCDX)</td>
<td></td>
</tr>
<tr>
<td>EC-Council Certified Security Specialist (ECSA)</td>
<td>Source: Foote Partners <em>IT Skills &amp; Certifications Pay Index™</em>, 1st Quarter 2018 data</td>
<td></td>
</tr>
<tr>
<td>GIAC Certified Perimeter Protection Analyst (GPPA)</td>
<td></td>
<td></td>
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<tr>
<td>InfoSys Security Architecture Professional (ISSAP/CISSP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CompTIA Advanced Security Practitioner (CASP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIAC Security Leadership(GSLC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIAC Enterprise Defender (GCED)</td>
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</tr>
</tbody>
</table>

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Tech Labor Trends Discussion & Analysis

IT Skills and Certifications Pay Index™

Data collected through April 1, 2018

- Why 2018 has become a dramatically different year for tech labor
- Labor Analyses:  Cybersecurity  Blockchain  Tech workforce solutions that are working
LABOR TRENDS DISCUSSION & ANALYSIS

**INTRODUCTION.** It’s difficult to find an employer that isn’t struggling to come up with its own unique tech staffing model that balances three things: the urgencies of new digital innovation, combating ever deepening security threats, and keeping increasingly complex systems and networks running smoothly and efficiently.

The staffing challenge has moved well beyond simply having to choose between contingent workers, full-time tech professionals, and a variety of third party services options. Over the next few years managers will continue to be tasked with leading a massive transformation of the technology and tech-business hybrid workforce to focus on delivering a wide variety of operational solution and revenue-generating opportunities including:

- Next-gen Internet of Things/M2M
- Artificial Intelligence/Machine Learning
- Blockchain
- Digital engagement
- Mobility
- Big Data/Information Integration/BI analytics
- Cybersecurity
- Automation
- DevOps
- Carbon-reducing technology/exponential energy
- Self-service IT
- Carbon-reducing tech/Exponential Energy
- Cloud computing
- Telemedicine

All of these depend on solving the puzzle of getting the mix of critical technology and business skills and experience just right when shortages of skills and talent have never been more profound or more constraining in effecting business transformation.

These changes don’t happen overnight. Practically speaking, it takes a few fiscal cycles to get budgets in line and recruiting and training efforts in place to build any new foundation for an optimally restructured workforce. To be sure, ‘clean sheeting’ your organizational systems and practices isn’t realistic: you need to build a new human resource foundation under what you’re already doing, incrementally strengthening that foundation over time. This takes a well-thought out job role architecture plus carefully crafted agile compensation models to get people paid to true competitive market levels and incented to perform at high levels.

**2018 has become a dramatically different year for tech labor**

Our take on the tech labor market in 2018— informed by our 3,188 research partner employers in the U.S. and Canada and 2,045 in Europe—is that employers are facing conspicuously harder tech labor challenges than any year in recent history and they are more nervous about it. That’s because it will get exponentially worse for them if they don’t start laying the groundwork right now for a new staffing paradigm that will soon be thrust upon each and every one of them.

Two long time labor trends have shifted quite dramatically recently that will help them to do this.

First, market value volatility for tech skills is smoothing out. The 981 certified and noncertified tech skills tracked in Foote Partners’ **Tech Skills and Certifications Volatility Index** are averaging quarter-to-quarter market value fluctuations of 22% in the last six months (percent of skills changing value) compared to 27% for the same period four years ago (see page 35 - 39). Second, the constant frenzy surrounding short term skills gaps and unfilled jobs targeted at point solutions has quieted down according to our recent quarterly labor market benchmark research.
LABOR TRENDS DISCUSSION, cont’d.

It’s being overtaken by something more urgent and potentially catastrophic when it comes to managing tech professionals. Sound a bit ominous? It should if your company is unprepared for several early stage, game-changing emerging technologies that will soon alter the landscape of not just businesses but the private lives of billions of people. Among them are Blockchain, the next generation of IoT (Internet of Things), Artificial Intelligence, Automation, Advanced Data Analytics, Cybersecurity, and a wide range of digital innovations.

The upshot is 2018 is shaping up to be a much-anticipated year when employers are finally beginning to take stock in how poorly prepared they are from a talent perspective for consuming these revolutionary though nascent technologies. And trust me, they will all be enthusiastically embracing them within the next three years.

The hardest truth they must face is that the human resource management function supporting technology professionals at most companies has for years been unable to get in front of the unique demands of the technology workforce. They’ve been barely getting by for years with short-term fixes. Here’s what it looks like from the perspective of HR leaders:

• People management systems and practices to tech professionals that have become frighteningly ineffective. Even ad hoc work-around solutions are failing
• Persistent fallout
  - Too many tech job titles
  - High tech staff churn in key roles, especially the most experienced tech workers.
  - Skills gaps. Difficulty finding and hiring tech professionals
  - Overreliance on consultants, contractors, temps
• Confusion about pay. Constant uncertainty about how much to pay tech professionals, especially new jobs and the “Swiss Army knife” hybrid positions.
• Job Definition/Design Chaos. Managing independently created tech jobs that don’t fit in very well with established tech roles…that are themselves ill-defined
• Job Path Uncertainty: tech workers have trouble navigating their careers and employers aren’t helping them very much

If these new blockbuster technologies existed independent of one another it would not be nearly as frightening from a labor demand perspective. But they don’t: they’re all part of one gigantic dynamic mesh. This mesh will demand an unprecedented level of talent that will place a stunning labor strain on employers regardless of whether they are developing, supporting, or consuming these pervasive groundbreaking technologies.

And here’s the rub: employers cannot aspire to capitalize on Blockchain, Artificial Intelligence, the next generation of IoT, and the rest without first climbing out of the deep hole they’ve been digging for years. That means replacing HR management systems and practices that lack the power, agility and flexibility necessary to do competitive combat in a labor environment substantially different than what has existed heretofore. The next few years will test employers’ people management capabilities will like never before.
LABOR TRENDS DISCUSSION, cont’d.

The good news is there is a window of opportunity right now while these new technologies are maturing.

We believe 2018 is the breakthrough year as businesses sense this labor market tsunami coming at them. They are finally commencing the serious work of repairing broken or underperforming people management systems and practices.

The only viable solution to this mess we’ve seen is applying architecture principals to the management of people. This shouldn’t be a novel idea but it is. It’s similar to how architecture thinking and practices were applied to technology inventorying and acquisition in the early 1990s and to businesses since the day they began. Enterprise architecture later became its own discipline as technology and business converged over the last two decades.

Tech People Architecture is similar in principle to traditional IT architecture initiatives but applied instead to workforce management and tech human capital. There are strategy and capability roadmaps, phase gate blueprints, benchmarks, performance metrics, and stakeholder management is critical. Governance issues need careful attention and business strategy drives it all. Agile Compensation is the answer to the chaos created by the proliferation of technology related job titles and lack of consistency in job definition and pay programs across the enterprise for the same work performed.

But with Agile Compensation and Tech People Architecture it’s about how key human capital management (HCM) elements such as job definition and design, skills demand and acquisition, compensation, incentives and recognition, professional development, and work/life balance plug into an overall optimized operational model. The model is tuned to new technologies, business strategy, organizational goals, and culture and performance philosophies, and it promotes flexibility and scalability, like any disciplined architecture approach.

People architecture approaches correct lack of job title standardization in the marketplace and too many job titles floating around IT departments, corporate departments, and business lines. With so many dimensions and variability in tech jobs, employers are unable to cope with the complexity of defining, determining pay, and laying out career paths for all these jobs. For many, serious retention and hiring problems are showing up for the first time. Recruiters are picking off your best people and candidates are suddenly rejecting offers.

Tensions are palpable and that’s one of the factors driving People Architecture and Agile Compensation in 2018. Let’s take a deeper dive into two of these emerging technologies to see why they’re going to succeed and what skills will be most in demand.

LABOR ANALYSIS: Cybersecurity

Security skills pay gap narrows but demand continues to grow. Market values for 83 info/cyber security certifications have been on a somewhat rocky path for two years, up 6% in average cash value as a group in the past two years but down 1% in the last six months. Our findings indicate that information security professionals are maturing in skills and capabilities just as the increasing sophistication of cyber-attack capabilities are demanding more experienced infosecurity professionals. Strong performing security certifications in the six months cuts a wide swath---cybersecurity, audit, forensics, penetration testing, secure software development, perimeter protection, and project management (see page ____ ) ---with declines most notable in management-level certifications and some of the same categories as gains.
LABOR TRENDS DISCUSSION, cont'd.

That's the good news. The bad news is that while cybercriminals and hacktivists are increasing in numbers and deepening their skill sets, the "good guys" are still struggling to keep pace in 2018 as hyper connectivity increases. CISOs are on notice that they will have to become more effective acquiring or internally developing the skill sets their organizations need and building sustainable practices to retain existing talent and solidify their organizations’ cyber resilience.

Without a doubt a cyber security skills gap has developed on a global basis. There are approximately 1 million unfilled cybersecurity jobs worldwide right now which is expected to rise to 1.5 million next year and 3.5 million by 2021 based on a projected demand for 6 million cybersec pros by 2019. According to a recent U.S. News and World report, the information security profession is growing at a 36.5% CAGR from 2012 to 2022. Cybersecurity jobs are growing 3.5 times faster than the overall IT job market and 12 times faster than the total labor market. Moreover, a Cyentia Institute 2018 study entitled “Unraveling the Cyber Skills Gap & Talent Shortage” found that 80% of respondents do not feel adequately prepared to defend their organizations. 68% of the 3,109 international tech professionals surveyed (81% working in cybersecurity) express doubts about their organization’s readiness to thwart advanced threats.

Foote Partner’s latest IT Skills and Certifications Pay Index™ provides evidence of employers’ response to the cybersecurity talent gap: the Certified Cyber Forensics Professional is earning the highest certification cash premium among all 451 reported in the Pay Index, averaging the equivalent of 17% of base salary. Notes Foote, “In our most recent April data update of our IT Professional Salary Survey, Cybersecurity Specialists with three years of experience are averaging $101,000 in base salary in 65 U.S. cities. Senior level cyber specialists with five years’ experience are averaging $119,000 with a top average salary of $151,000 in San Jose, California.”

But with a nagging lack of consistency nationally in cybersecurity career definitions, and a shocking dearth of experienced cyber professionals, employers can expect to experience difficulties in attracting and retaining cybersecurity talent for months or even years to come.

Employers are more aware that they don’t have the right people in their security departments. They may have very good technical people who can fix firewalls and implement basic perimeter solutions but what’s missing are experienced security professionals who understand:

• Threat Intelligence and Analysis  • Secure Data Management
• Valuing Asset Inventory  • Information Risk Management
• Access/Identity Management  • Process Optimization and Agile
• Visibility  • Controls
• Cryptography  • Secure and defensive programming
• Audit log analysis  • Network Security
• Compliance and policy  • Business Continuity Management

Chief Security Officers are desperate for qualified talent to determine whether or not there’s been an attack, to identify root cause, and to figure out what information has been exposed. They’re allocating more financial resources to security challenges according to our data. But the linkage between the business and the information security and cyberseceurty organizations is still too weak from a labor perspective.

“We’re going to need as many people as possible to ‘hit the ground running’ to meet the demand. That’s going to be a tall order not to mention a bit unrealistic in the short term. The fact is it’s going to take another three to five years to narrow this particular skills gap. We’ll get there because indications are that the money and incentives are sufficient to get vendors, employers, and training organizations focused on the solution.”
LABOR TRENDS DISCUSSION, cont’d.

*Training becomes the critical differentiator.* Cybersecurity skill sets are still evoking in training protocols. “Hands-on experience in a cyber security environment is more critical to cyber security jobs than just academic learning”, insists Foote. “Only 7% of the top universities around the world offer a technical cybersecurity degree at the undergraduate level. Cybersecurity curriculum has to dramatically expand and colleges need to aggressively pursue internship opportunities for their students to expose them to real-world conditions. There’s got to be clear channels for attracting people into a profession that does not have the cache of software development”.

This same Cyentia Institute study concluded that organizations that invest in training show improved preparedness at both the employee and corporate level. The problem is that not enough companies are investing in training cybersecurity skills: half of the respondents pay for their own training and only 15% reported that their employers cover all cybersecurity training expenses. Moreover, 60% reported using personal time for IT and security training. Only 13% of companies conduct training during normal business hours. Only 35% of respondents report spending at least $1,000 annually in training-related expenses.

The figure below shows where investment intersects with value according to the perceptions, experience, and activities of Security Operations Center (SOC) and Incident Response (IR) staff. In theory, activities in the upper-left would offer good value at comparatively low cost. The only activity squarely in that quadrant? Training.

![Fig. 2](image-url)
LABOR TRENDS DISCUSSION, cont’d.

One of the key findings in our recent in-depth interviews with more than 90 Chief Security Officers and Chief Information Security Officers is an expanded definition of “security professional” this is being taken more into account in hiring decisions. It’s a long list but it can be distilled down to these:

- Ability to translate technology risk to business risk.
- Think business and learn business speak
- Understand your industry
- Be open-minded and think outside the box (be strategic and not just tactical)
- Develop your people skills and work at being trustworthy.
- Be able to write and present high-level concepts coherently and succinctly. Keeping in mind the language of business

Cybersecurity leadership and governance issues. In some cases, it's going to become apparent that organizations simply don’t have the right security leadership in place,” suggests Foote. “Organizations have to ask themselves if security itself is sitting in the right place within the organization, who is accountable for security, and how to hold them accountable. You can’t avoid every serious incident, and while many businesses are good at incident management, too few have an established, organized approach for evaluating what went wrong and how to fix it. As a result, they are incurring unnecessary costs and accepting inappropriate risks.

Organizations of all sizes need to take stock now in order to ensure they are fully prepared and engaged to deal with these emerging security challenges and in particular cyber security strategy. By adopting a realistic, broad-based, collaborative approach to cyber security and resilience, government departments, regulators, senior business managers and information security professionals will better understand the true nature of cyber threats and how to respond quickly and appropriately.

Some companies are augmenting their staffing with machine learning technology and probability theory to model patterns of behavior and flag anomalous activity. Machine learning technology is increasingly being adopted as a way to reduce the noise (alerts) that traditional security products produce and to bubble up mid- and high-level concerns to IT staff. The discipline of machine learning finds its way into many large companies through the hiring of data scientists, who use algorithms to efficiently analyze event logs for their security teams.

Overall, we expect an increase in high-profile breaches in the near future. This will push corporate boards and senior business executives even farther to face decades of inadequately staffing their security operations and must now conquer a severe cybersecurity talent gaps. They only solution will be to train, train, train over the next four years until as the gap narrows organically.

LABOR ANALYSIS: Blockchain

Research analyst firm IDC forecasts that by 2021 at least 25 percent of the Global 2000 will use blockchain services as a foundation for digital trust at scale. Dozens of high profile companies—Maersk, Barclays, UBS, Walmart, British Airways, Sony, FedEx, and Samsung among them—have already implemented or experimented with blockchain technologies in their business processes. Large vendors IBM, Microsoft, Hewlett Packard Enterprise, Amazon Web Services, Baidu, and SAP have made sizable investments and some are now rolling out blockchain-as-a-service solutions in their partner accounts. Last fall EY reported at least 115 DLT (distributed ledger technology) start-ups around the world, employing more than 2,000 people; our research finds start-up have grown by nearly 20X today.
LABOR TRENDS DISCUSSION, cont'd.

Aside from North America, we see big blockchain technology investments in the Middle East, Asia, and in Europe where blockchain centers in Berlin, Zurich, Singapore, London, and South Korea are creating buzz.

After the explosive growth of bitcoin in last year, 2018 has so far been marked as the true beginning of a broader labor marketplace awareness of demand for specific blockchain jobs and skills. This month Computerworld published an unverified account of a 6,000% year-over-year growth in blockchain jobs in the first quarter of this year at one online job posting site.

Currently the hottest demand for blockchain jobs is concentrated in high tech centers (San Jose, San Francisco, Palo Alto, Boston, Seattle, Austin, Raleigh/Durham/Chapel Hill, Washington D.C.), financial centers (New York, Chicago), plus Atlanta, Los Angeles, Denver, Houston, and Charlotte. Blockchain solutions are focusing on the finance, healthcare, and retail industries more than others this year.

What is blockchain…and when? At a high level, blockchain technology is a way of securely managing access and information. What makes DLT so interesting to businesses and some governments is how it is positioned to make vast improvements in an almost endless array of transactional activities.

Modest prognostications are that it might have a widespread impact on the Four Horsemen of Capitalism: revenues, profitability, market share, and customers satisfaction. More intrepid analysts including Foote Partners are suggesting that once the kinks get worked out—and they will—the blockchain platform, in concert with other key technology fueled developments such as Internet of Things, will propel a revolution at a deep core business process level.

Previously unattainable ways to reduce costs and improve efficiencies will become commonplace. Even more, it will enable practical solutions for saving human lives and easing suffering as its benefits are applied to, for example, food distribution and manufacturing supply chains and to healthcare.

Skills shortages will continue for blockchain developers but especially for the architects, project managers, and quality engineers who can design, build, and test Blockchain operating models. Understanding how Blockchain integrates with IoT, Artificial Intelligence, Machine Learning, Robotics, and other technologies is a plus now for architects but will be a requirement in the future as these other technologies mature and adoption rates increase.

Blockchain skills in short supply and therefore best bets in 2018 for tech professionals looking to gain entry into this niche include:

- Ethereum's smart contracts platform.
- Cryptocurrency platforms. Filecoin (for storage); SparkleCOIN; Bitcoin.
- Gameflip, a global marketplace for gamers to transact digital goods for games across all media platforms
- Smart contract programming languages: Solidity; LLL; Serpent.

Foote Partners latest cash skills pay premium survey data reveals Blockchain premiums are ranging from the equivalent of 12 percent to 17 percent of base salary and averaging 15 percent.
LABOR TRENDS DISCUSSION, cont'd.

Blockchain developers need a minimum of two years professional experience as a software engineer; a solid understanding of ledgers, consensus methods, blockchains, and cryptocurrencies; expertise in threat analytics, anomaly detection, and performance management; strong understanding of algorithms, data structures, cryptography and data security, and decentralized technologies; a good understanding of distributed storage; at least some degree of experience creating blockchain frameworks and business applications. Technical skills for developers may include strong demonstrated coding skills in at least one of these languages: Go, C, C++, C#, Java, JavaScript, Python, .NET. Other technical skills include Microsoft SQL Server, Visual Studio, MVC, AJAX, SQL, Node.js, JQuery, SOAP, REST, FTP, HTML, XML, XSLT, XCOD, neural-networks, Agile Scrum, MYSQL. Soft skills common to any effective developer operating in any high-performance team setting are also important.

Blockchain project managers convert a company's needs in common English into technical language, and then from the blockchain developers' language back into regular English. They plan and supervise the execution of blockchain project brought in-house and could use a PM certification.

Blockchain quality engineers are responsible for ensuring quality in all areas of blockchain development, such as automation frameworks and tests, manual and performance testing and dashboards, all of which works to support mobile, web and platform engineering. They research and advise on blockchain tools and develop quality assurance automated test standards as well as define, write and execute automation plans based on requirements and unique regression testing needs. Drives process improvements within the QA function. Ideal candidates have engineering and/or MBA degrees.

LABOR FORECAST: Tech Workforce Transformation

Popularity of Agile Compensation and Tech People Architecture practices as solutions to persistent IT labor problems.

Clearly the widespread acceptance of technology's singular role as an engine of innovation and competitiveness is an unquestioned, as is the energized role that has been thrust upon technology professionals and organizations everywhere to monetize technology. Too often those in the C-suite have been reluctant to hold their IT leaders accountable for such a heavy responsibility, instead choosing to create tech innovation departments and/or hire expensive consulting firms to do what they believe their IT leaders and tech workers are not capable of doing.

In 2018 senior business management are asking their tech leaders as well as their business line leaders to manage large segments of technology talent to be more accountable—for architecting, building and securing new products and services that are largely technology based. And as these leaders are held accountable for higher levels of information and tech management, their performance is being more closely scrutinized. Examples include advanced analytics (for making more informed decisions), greater security (against dreaded cyber attacks), and capitalizing on fast moving trends such as Blockchain, Machine learning, and digital innovation in general. Meanwhile, for the CIO, the imperative to streamline operations, reduce costs in every possible manner, and ensure compliance with countless regulations must still be met.

Taken together, this has placed tremendous pressure on tech leadership to execute flawlessly and predictably in unfamiliar areas. For many employers this can only be achieved with a dramatic transformation of the IT workforce to a more appropriately skilled group of
LABOR TRENDS DISCUSSION, cont’d.

professionals who are capable of a level of agility, flexibility and aptitude not commonly associated with their predecessors. Companies must be able to architect their human capital to meet business needs now and in the future.

This is exactly what is needed in managing IT human capital and what Tech People Architecture has delivered to those employers who have implemented it.

Tech workforce management has had difficulty finding and retaining people that can perform at a high caliber on increasingly more difficult tasks and at the same time they’re feeling immense performance pressure. Plus, today the tech workforce is spread throughout the enterprise doing multidimensional jobs that are hard to categorize, price and manage. In this environment architecting of people management is the last and most logical frontier.

Employers tell us that people architecture practices have been instrumental is dealing with lack of job title standardization in the marketplace and having too many job titles among their internal technology workforce. With so many dimensions and variability in tech jobs, employers have been progressively unable to cope with the complexity of defining, determining pay, and laying out career paths for all these jobs that is consistent across the enterprise.

For many, serious retention and hiring problems were showing up for the first time. Work around solutions used for years to cope with systemic weaknesses in their HR systems were no longer effective. Recruiters started picking off their best people and candidates were suddenly rejecting offers.

**Agile Compensation** is the answer to the chaos in paying tech professionals created by the proliferation of technology related job titles and lack of consistency in job definitions and pay practices across the enterprise for the same work performed. **People Architecture** is similar in principle to traditional IT architecture initiatives but applied instead to workforce management and tech human capital. There are strategy and capability roadmaps, phase gate blueprints, benchmarks, performance metrics, and stakeholder management. Governance issues need careful attention and business strategy drives it all.

But with Agile Compensation and People Architecture it’s about how key human capital management (HCM) elements such as job definition and design, skills demand and acquisition, compensation, incentives and recognition, professional development, and work/life balance plug into an overall optimized operational model. The model is tuned to new technologies, shifting business strategy and organizational imperatives, culture, and performance philosophies. Together they propel flexibility and scalability, like any disciplined architecture approach. This is exactly what has been missing for decades in the HR functions at many employers, creating constant labor gaps, skills deficits, and failure to execute consistently.

For employers, Agile Compensation and People Architecture has solved these problems:

- Reduces by 50% to 70% the number of tech related job titles necessary to plan and administer pay;
- Significantly increases retention rates;
- Narrows or altogether eliminates persistent technology skills gaps;
- Improves individual and team performance and more predictable execution;
- Increases consistent availability and quality of skills and workers;
- Achieves higher utilization rates;
- Maps out how workers can move more effectively through promotions/career paths
LABOR TRENDS DISCUSSION, cont’d.

Technical architecture practices have been successful because, when done well, companies achieve an understanding of what they have systems-wise and could then connect it to where they were going and how they were going to get there, all within a process inclusive of all the various stakeholders who shared the risk in the outcome. They helped to clearly define enterprise technology capabilities and give companies more options and flexibility going forward.

Tech management is having difficulty finding and retaining people that can perform at a high caliber on increasingly more difficult tasks and at the same time they’re feeling immense performance pressure. Plus, today the IT workforce today is spread throughout the enterprise doing multidimensional jobs that are hard to categorize, price and manage. In this environment, many IT leaders and business executives have come to see the architecting of people management as the next logical frontier.

*Tech People Architecture* is similar in principle to traditional IT architecture initiatives but applied instead to workforce management and IT human capital. There are strategy and capability roadmaps, phase gate blueprints, benchmarks, performance metrics, and stakeholder management is critical. Governance issues need careful attention and business strategy drives it all. *Agile Compensation* is the answer to the chaos created by the proliferation of technology related job titles and lack of consistency in job definition and pay programs across the enterprise for the same work performed.

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These are palpable evidence in 2018 that architecture and agility initiatives are necessary to stem the tide of chaos in your technology workforce. For more information follow Foote Partners’ *Technology People Architecture blog* on CIO.com.
IT Skills & Certifications Pay Data Trend Charts

IT Skills and Certifications Pay Index™ – 1st Quarter 2018 data edition
(Data collected through April 1, 2018)

- IT Certifications (page 23)
- Noncertified IT skills (page 29)
- IT Skills & Certifications Volatility Index™ (page 35)
How to interpret gains and losses in IT skills and certifications pay premiums

Quarterly gains and losses in premium pay reflect a widening or narrowing, respectively, in the gap between supply and demand for skills and certifications. This may occur for any number of reasons. For example, a quarterly decline in pay for a skill may signal that the market supply of talent for that skill is catching up to demand—not necessarily that demand is starting to wane. IT professionals are often attracted to a skill or certification if they perceive that it has rising value in the marketplace and therefore can help them to achieve higher pay, greater job security, a promotion, or more flexibility in their career choices. As they pursue greater competency in that skill or as more workers attain certification, supply increases and market pricing (which is elastic to the laws of supply and demand) will be driven downward unless demand is rising at the same proportional rate. Conversely, if demand rises and supply is not increasing to match that level of demand, pay premiums for specific skills and certifications will increase.

Therefore, when interpreting gains and losses in market pay it is important to consider all factors that could be driving supply and demand and market perception. Those factors range from:

- aggressive marketing of certifications by vendors;
- changes in certification programs (e.g. certification extensions or retirement);
- new technology and evolution/maturation of current technologies;
- technology adoption rate;
- product integration strategies;
- economic conditions;
- employment opportunities;
- mergers/acquisitions;
- budget cycles and the timing of skills and talent acquisition by employers;
- changes in labor sourcing plans pursuant to company strategies.
Fig 3 - Premium Pay for Certified and Noncertified Tech Skills Has Become a Popular Component of IT Compensation as Organizations Become More Digital

(Average Median Pay for a Single Certified vs. Noncertified IT Skill, Last 10 years – 74,664 IT professionals)

11 Yr Growth/Decline in Pay for 981 Tech Skills and Certifications (through 4/1/2018)

(Pay data supporting these charts available in the 2018 IT Skills and Certifications Pay Index™.)

Source: Foote Partners, IT Skills and Certifications Pay Index™
(1Q 2007 – 1Q 2018 data editions)
IT Certifications: Latest market value trends

(Data collected through April 1, 2018)
2-YEAR IT CERTIFICATIONS PAY TRENDS
(Through 4/1/2018 – 74,664 IT Professionals)

3 & 12 MONTH IT CERTIFICATIONS PAY TRENDS BY CATEGORY
(Through 4/1/2018 – 74,664 IT Professionals)

% Change in Average Median Pay for a Single IT Certification

SOURCE: Data supporting these charts is from Foote Partners IT Skills & Certifications Pay Index™ (2004 to 2018 quarterly editions)

(Pay data supporting these charts available in the IT Skills and Certifications Pay Index™ – 1Q 2018 edition)
HIGHEST PAYING IT Certifications (cash pay premiums ranked, all 451 certs surveyed)

These IT certifications are among those earning the highest pay premiums (data collected January 1st to April 1st, 2018). Shown in alphabetical by overall rank in descending order including ties.

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Avaya Certified Implementation Specialist
Avaya Certified Professional Design Specialist
Avaya Certified Solution Specialist
AWS Certified Solutions Architect – Associate
AWS Certified Solutions Architect – Professional
AWS Certified SysOps Administrator – Associate
AWS Certified Developer – Associate
AWS Certified DevOps Engineer - Professional
BICSI ITS Technician
Brocade Certified Network Engineer
Brocade Certified Network Professional
Brocade Certified Fabric Designer
Brocade Certified Fabric Professional (BCFP)
Certificate of Cloud Security Knowledge
Certification of Competency in Business Analysis
Certified Associate in Project Management
Certified Analytics Professional (CAP)
Certified Business Analysis Professional (CBAP)
Certified Business Continuity Professional (CBCP)
Certified Cloud Architect
Certified Cloud Security Professional
Certified Cloud Technology Professional
Certified Computer Examiner (CCE)
Certified Computing Professional (CCP-ISC²)
Certified in Convergent Network Technologies (CCNT)
Certified Cyber Forensics Professional
Certified Database Design Specialist
Certified Database Management Professional
Certified Data Management Professional
Certified Disaster Recovery Engineer (CDRE)
Certified Forensic Computer Examiner
Certified Fraud Examiner
Certified Healthcare Information Security and Privacy Practitioner (HCISPP)
Certified IT Compliance Professional
Certified Salesforce Developer
Certified Salesforce Advanced Developer
Certified in the Governance of Enterprise IT (CGEIT)
Certified in Risk and Information Systems Control (CRISC)
Certified Information Security Manager (CISM)
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Certified Information Systems Security Professional (CISSP)
Certified IT Architect (IASA CITA)
Certified Manager of Software Quality (CMSQ)
Certified Project Management Practitioner
Certified Protection Professional
Certified ScrumMaster
Certified Scrum Coach
Certified Scrum Developer
Certified Scrum Product Owner
Certified Scrum Professional
Certified Scrum Trainer
Certified Secure Software Lifecycle Professional (CSSLP)
Certified Software Quality Analyst (CSQA)
Certified Technical Architect (Salesforce.com)
Certified Telecommunications Network Specialist (CTNS)
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Certified Cisco Systems Instructor (CCSI)
Cisco Certified Architect
Cisco Certified Design Associate (CCDA)
Cisco Certified Design Expert (CCDE)
Cisco Certified Design Professional (CCDP)
Cisco Certified Entry Network Technician (CCENT)
Cisco Certified Internetwork Expert (CCIE)
Cisco Certified Network Associate (CCNA)
Cisco Certified Network Associate - Data Center
Cisco Certified Network Associate - Security
Cisco Certified Network Associate Wireless (CNP Wireless)
Cisco Certified Network Professional Wireless (CCNP Wireless)
Cisco Certified Network Professional (CCNP)
Cisco Certified Network Professional - Data Center
Cisco Certified Network Professional - Security
Cisco Certified Systems Instructor (CCSI)
Cisco Data Center Unified Computing Design Specialist
Cisco Data Center Unified Computing Support Specialist
Cisco Data Center Unified Fabric Design Specialist
Cisco Data Center Unified Fabric Support Specialist
Cisco IP Communications Express Specialist
Cisco IP Contact Center Express Specialist (CPCC)
Cisco IP Telephony Design Specialist
Cisco IP Telephony Support Specialist
Cisco IPS (Intrusion Prevention System) Specialist
Cisco VPN Specialist
Citrix Certified Administrator - Networking (CCA)
Citrix Certified Associate - Virtualization
Citrix Certified Enterprise Engineer (CCEE) for Virtualization
Citrix Certified Expert – Virtualization
Citrix Certified Instructor – (CCI – Virtualization, Networking, or Mobility)
Citrix Certified Professional – Mobility (CCP-M)
Citrix Certified Professional - Networking
Citrix Certified Professional-Virtualization (CCP-V)
CIW Certified Database Design Specialist
CIW Network Technology Associate
CIW Web Design Professional
CIW Web Development Professional
CIW Web Foundations Associate
Cloud U (Rackspace)
Cloudera Certified Data Analyst
Cloudera Certified Developer for Apache Hadoop
Cloudura Certified Administrator for Apache Hadoop
Cloudura Certified Professional: Data Scientist
Cloudura Certified Specialist in Apache HBase
CompTIA A+
CompTIA Advanced Security Practitioner (CASP)
CompTIA Certified Technical Trainer (CTT+)
CompTIA Cloud Essentials
CompTIA Cloud+
CompTIA Linux+
CompTIA Mobile App Security+
CompTIA Mobility+
CompTIA Network (Network+)
CompTIA Project+
CompTIA Security+
CompTIA Server+
CompTIA Storage+
Convergence Technologies Professional (CTP)
CSX CyberSecurity Practitioner (CSXP)
CWNP Certified Wireless Security Professional (CWSP)
CWNP/Certified Wireless Network Administration (CWA)
CWNP/Certified Wireless Network Trainee (CWNT)
CWNP/Certified Wireless Network Expert (CWNE)
CWNP/Certified Wireless Technology Specialist (CWT)
CWTS/Certified Wireless Technology Specialist
Cyber Security Forensic Analyst
EC-Council Certified Network Defense Architect Certification
EC-Council Certified Ethical Hacker (CEH)
EC-Council Certified Incident Handler
EC-Council Certified Secure Programmer (ECSP)
EC-Council Certified Security Analyst (ECSA)
EC-Council Certified VoIP Professional (ECVP)
EC-Council Computer Hacking Forensic Investigator (CHFI)
EC-Council Disaster Recovery Professional (EDRP)
EC-Council Licensed Penetration Tester (LPT)
EC-Council Network Security Administrator (ENSA)
EMC Cloud Architect Expert
EMC Cloud Architect Specialist
EMC Cloud Engineer (EMCCE)
EMC Data Center Architect (EMCDCA - all versions)
EMC Data Science Associate
EMC Data Science Specialist, Advanced Analytics
EMC Implementation Engineer - Expert (EMCIE)
EMC Implementation Engineer - Specialist (EMCIE)
EMC Information Storage Associate (EMCISA)
EMC Platform Engineer - Specialist (EMCPE)
EMC Storage Administrator - Associate (EMCSA-A)
EMC Storage Administrator - Expert (EMCSA-E)
EMC Storage Administrator - Specialist (EMCSA-S)
EMC System Administrator – Documentum Specialist (EMCSyA)
EMC Technology Architect - Expert (EMCTA)
EMC Technology Architect - Specialist (EMCTA)
GIAC Assessing and Auditing Wireless Networks
GIAC Certified Perimeter Protection Analyst
GIAC Certified Forensics Analyst (GCFI)
GIAC Certified Forensics Examiner
GIAC Certified Incident Handler (GCIH)
GIAC Certified Intrusion Analyst (GClA)
GIAC Certified Penetration Tester (OPEN)
GIAC Certified Perimeter Protection Analyst (GPPA)
GIAC Certified Project Manager (GCPM)
GIAC Certified Unix Security Administrator (GCUX)
GIAC Certified Web Application Defender
GIAC Certified Windows Security Administrator (GCWN)
GIAC Critical Controls Certifications (GCCC)
GIAC Cyber Threat Intelligence (GCTI)
GIAC Enterprise Defender (GCED)
GIAC Exploit Researcher and Advanced Penetration Tester (GWAPT)
GIAC Information Security Fundamentals (GISF)
GIAC Information Security Professional (GISP)
GIAC Mobile Device Security Analyst (GMOB)
GIAC Network Forensic Analyst (GNFA)
GIAC Python Coder (GPYC)
GIAC Reverse Engineering Malware (GREM)
GIAC Secure Software Programmer–Java
GIAC Security Essentials (GSEC)
GIAC Security Leadership(GSLC)
GIAC Systems and Network Auditor (GSNA)
GIAC Web Application Penetration Tester (GWAPT)
Help Desk Analyst: Tier 1 Support Specialist/Ed2Go
Help Desk Team Lead/RCCSP
HDI Customer Service Representative
HDI Desktop Support Manager
HDI Desktop Support Technician
HDI Support Center Analyst
HDI Support Center Director
HDI Support Center Manager
HP ASE – Cloud Integrator V2
HP ASE - Data Center and Cloud Architect V2/V3
HP ASE - Storage Solutions Architect V1/V2
HP ASE Cloud Architect V2
HP ASE Vertica Big Data Solutions Administrator V1
HP ATM - Cloud Administrator V1
HP ATM - Storage Solutions V1/V2
HP ATM Big Data Vertica Solutions V1
HP Master Accredited Solutions Expert (MASE - all)
HP Master ASE - Storage Solutions Architect V1/V2
HP Accredited Integration Specialist (AIS)
HP Accredited Solutions Expert (ASE - all)
HP ASE—Data Center and Cloud Architect/V1
IBM Advanced Systems Administrator (all)
IBM Certified Administrator for SOA Solutions: WebSphere Process Server
IBM Certified Advanced Application Developer (all)
IBM Certified Advanced Database Administrator
IBM Certified Advanced Security Professional
IBM Certified Advanced Technical Expert - Power Systems with AIX v2/v3
IBM Certified Application Developer (all)
IBM Certified Database Administrator - DB2
IBM Certified Developer - Cognos
IBM Certified Infrastructure Systems Architect
IBM Certified Operator - AIX Basic Ops
IBM Certified SOA Solution Designer
IBM Certified Software Advisor - Cloud Computing Architecture V4
IBM Certified Solution Architect – Cloud Computing Infrastructure V1
IBM Certified Solution Designer - WebSphere
IBM Certified Solution Developer - DB2 SQL
IBM Certified Solution Developer: WebSphere (all)
IBM Certified Solution Expert - Cognos
IBM Certified Specialist - System z
IBM Certified Specialist - Cognos
IBM Certified Specialist - Storage
IBM Certified Systems Administrator - AIX 7
IBM Certified Systems Administrator - IBM i 6.1
IBM Certified Systems Administrator - WebSphere
IBM Certified Systems Administrator (all)
IBM Certified Systems Expert - AIX and Linux V2
IBM Certified Systems Expert - Virtualization
Technical Support for AIX and Linux - v2
InfoSys Security Engineering Professional (ISSSEP/CISSP)
InfoSys Security Management Professional (ISSMP/CISSP)
ITIL Expert Certification
ITIL Intermediate Level Certification
JBoss Certified Developer (Seam, Persistence, ESB)
Juniper Networks Certified Internet Associate
Juniper Networks Certified Internet Specialist
Juniper Networks Certified Internet Professional
Juniper Networks Certified Internet Expert
Linux Professional Institute certification (LPIC-2)
Linux Professional Institute certification (LPIC-3)
Microsoft Certified IT Professional: DBA
Microsoft Certified Professional Developer (all)
Microsoft Certified Solution Developer (MCSD)
Microsoft Certified Solution Developer: Applications Lifecycle Management
Microsoft Certified Solutions Associate(all)
Microsoft Certified Solutions Associate: SQL Server 2012/2014
Microsoft Certified Solutions Associate: Windows Server 2016
Microsoft Certified Solutions Expert: Business Intelligence
Microsoft Certified Solutions Expert: Communications
Microsoft Certified Solutions Expert: Data Management and Analytics
Microsoft Certified Solutions Expert: Data Platform
Microsoft Certified Solutions Expert: Desktop Infrastructure
Microsoft Certified Solutions Expert: Private Cloud
Microsoft Certified Solutions Expert: Cloud Platform and Infrastructure
Microsoft Certified Solutions Master(all)
Microsoft Certified Technology Specialist:
Microsoft Dynamics CRM
Microsoft Certified Technology Specialist: SQL Server 2008
Microsoft Certified Trainer (MCT)
Microsoft Office Specialist
Microsoft Specialist Certification in Microsoft Azure
Microsoft Specialist in Windows 10
Mongo DB Certified DBA
Mongo DB Certified Developer
NetApp Certified Data Administrator, ONTAP (NCD)
NetScout/Genius Certified Analyst (nCA)
NetScout/Genius Certified Expert (nCE)
NetScout/Genius Certified Master (nCM)
NetScout/Genius Certified Professional (nCP)
NetScout Certified Instructor
Novell Certified Linux Engineer (Novell CLE)
Novell Certified Linux Professional (Novell CLP)
Novell/Certified Internet Professional (CIP)
Novell/Certified Novell Administrator (CNA)
Novell/Certified Novell Engineer (CNE)
Novell Identity Manager Administrator
Oracle Administrator Certified Associate - DBA (OCA)
Oracle Certified Associate Administrator (Open CA)
Oracle Certified IT Specialist (Open CITS)
Oracle Certified Master Architect
Oracle Certified Master Certified IT Specialist (Open CITS)
Oracle Business Intelligence Foundation Suite 11G Certified Implementation Specialist
Oracle Certified Associate - DBA (OCA)
Oracle Certified Associate - Java SE Programmer
Oracle Certified Associate - MySQL 5
Oracle Certified Associate - WebLogic Server Administrator
Oracle Certified Expert - Java Platform EE Developer
Oracle Certified Expert - MySQL 5.1 Cluster Database Administrator
Oracle Certified Expert - Siebel CRM Business Analyst
Oracle Certified Expert - Solaris 10 Network Administrator for Solaris
Oracle Certified Master - DBA (OCM)
Oracle Certified Master - Java EE Enterprise Architect
Oracle Certified Master - Java SE Developer
Oracle Certified Professional - Advanced PL/SQL Developer
Oracle Certified Professional - Application Server Administrator
Oracle Certified Professional - Database Cloud Administrator
Oracle Certified Professional - DBA (OCP)
Oracle Certified Professional - E-Business Suite 12
Oracle Certified Professional - Forms Developer
Oracle Certified Professional - Java EE Web Services Developer
Oracle Certified Professional - Java SE Programmer
Oracle Certified Professional - MySQL 5 Database Administrator
Oracle Certified Professional - MySQL 5 Developer
Oracle Certified Professional - PL/SQL Developer
Oracle Certified Professional - Solaris 10 Systems Administrator
Oracle Certified Professional, Java EE Web Component Developer
Oracle Certified WebLogic Server System Administrator Certified Expert
Oracle Certified 11g Certified Implementation Specialist
Oracle Linux Certified Administrator (OCA)
Oracle SOA Infrastructure Implementation Certified Expert
Oracle VM 3.0 for x86 Certified Implementation Specialist
451 IT Certifications Reported
(new this quarter in red)

Pegasystems Certified Lead System Architect
Pegasystems Certified Senior Systems Architect
Pegasystems Certified System Architect
Pegasystems Certified Pega Business Architect
PMI Agile Certified Practitioner (PMI-ACP)
PMI Portfolio Management Professional (PMP)
PMI Professional in Business Analysis (PMI-PBA)
PMI Program Management Professional (PgMP)
PMI Project Management Professional (PMP)
PMI Risk Management Professional (PMi-RMP)
Professional Certified Investigator
Professional in Project Management (GAQM)
Qualified Information Security Professional QISP
Red Hat Certified Architect (RHCA)
Red Hat Certified Architect: Application Development
Red Hat Certified Architect: Application Platform
Red Hat Certified Architect: Cloud
Red Hat Certified Architect: DevOps
Red Hat Certified Datacenter Specialist (RHCDS)
Red Hat Certified Engineer in Red Hat OpenStack
Red Hat Certified Engineer(RHCE)
Red Hat Certified Security Specialist (RHCSS)
Red Hat Certified System Administrator in Red Hat OpenStack
Red Hat Certified Systems Administrator (RHCSA)
RedHat Certified Technician (RHCT)
RedHat Certified Specialist in Virtualization
RSA Certified Administrator (RSA/CA)
RSA Certified Instructor (RSA/CI)
RSA Certified Systems Engineer (RSA/CSE)
Salesforce.com Certified Technical Architect
SAS Certified Advanced Programmer
SAS Certified Base Programmer
SAS Certified Big Data Professional Using SAS 9
SAS Certified Data Integration Developer for SAS 9
SAS Certified Data Scientist
SAS Certified Predictive Modeler - SAS Enterprise Miner 7
SAS Certified Statistical Business Analyst - SAS 9
Security Certified Network Architect (SCNA)
Security Certified Network Professional (SCNP)
Security Certified Network Specialist (SCNS)
Siebel 8 Consultant Certified Expert
Six Sigma Black Belt
Six Sigma Master Black Belt
Six Sigma Green Belt

SNIA Certified Storage Architect
SNIA Certified Storage Networking Expert (SCSN-E)
SNIA Certified Storage Professional
SNIA Certified Systems Engineer Sniffer Certified Expert
SolarWinds Certified Professional (SCP)
Systems Security Certified Practitioner (SSCP)
Teradata 14 Certified Associate
Teradata 14 Certified Database Administrator
Teradata 14 Certified Enterprise Architect
Teradata 14 Certified Master
Teradata 14 Certified Professional
Teradata 14 Certified Solutions Developer
Teradata 14 Certified Technical Specialist
TIBCO Certified Professional
TIBCO Certified SOA Architect
TOGAF 9 Certified
VMware Certified Advanced Professional – Cloud Infrastructure Administration (VCAP-CIA)
VMware Certified Advanced Professional – Cloud Infrastructure Design (VCAP-CID)
VMware Certified Advanced Professional – Data Center Administration (VCAP-DCA)
VMware Certified Advanced Professional – Data Center Design (VCAP-DDC)
VMware Certified Advanced Professional (VCAP)
VMware Certified Associate - Cloud (VCA-Cloud)
VMware Certified Associate - Data Center Virtualization (VCA-DCV)
VMware Certified Associate - Workforce Mobility (VCA-WM)
VMware Certified Design Expert - Cloud (VCDX-Cloud)
VMware Certified Design Expert (VCDX)
VMware Certified Design Expert 5 - Data Center Virtualization (VCDX5-DCV)
VMware Certified Professional 4/5/6(VCP 4/5/6)
VMware Certified Professional 5 - Data Center Virtualization (VCP5-DCV)
VMware Certified Professional 6 - Data Center Virtualization (VCP6-DCV)
VMware Certified Professional-Cloud (VCP6-Cloud)
IT Skills (Noncertified): Latest market value trends

(Data collected through April 1, 2018)
2-YEAR NONCERTIFIED IT SKILLS PAY TRENDS
(Through 4/1/2018 – 74,664 IT Professionals)

NONCERTIFIED IT SKILLS PAY TRENDS BY CATEGORY
Average Median Pay for a Single IT Skill (noncertified)
(Through 4/1/2018 – 74,664 IT Professionals)

SOURCE: Data supporting these charts is from Foote Partners IT Skills & Certifications Pay Index™ (2004 to 2018 quarterly editions)

(Pay data supporting these charts available in the IT Skills and Certifications Pay Index™ – 1Q 2018 edition)
**HIGHEST PAYING Noncertified IT Skills** (ranked, all 530 skills surveyed)

These **noncertified IT skills** are among those earning the highest pay premiums (data collected January 1st to April 1st, 2018). **Shown in alphabetical by overall rank** in descending order including ties.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tie</td>
<td>Complex Event Processing/Event Correlation</td>
</tr>
<tr>
<td></td>
<td>Security architecture and models</td>
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<tr>
<td></td>
<td>TIBCO ActiveMatrix BusinessWorks</td>
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<tr>
<td></td>
<td>TOGAF (Enterprise Architecture)</td>
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<tr>
<td>2. Tie</td>
<td>Apache Zookeeper</td>
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<td></td>
<td>COBIT</td>
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<td></td>
<td>Machine Learning</td>
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<td></td>
<td>Prescriptive Analytics</td>
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<td></td>
<td>Risk analytics/assessment</td>
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<td></td>
<td>Zachman Framework</td>
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<tr>
<td>3. Tie</td>
<td>Apache Hive</td>
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<tr>
<td></td>
<td>Blockchain</td>
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<td></td>
<td>Cloud Foundry PaaS</td>
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<td></td>
<td>Cybersecurity</td>
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<td></td>
<td>Data Governance</td>
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<td></td>
<td>DevOps</td>
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<td></td>
<td>Ethereum</td>
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<td>Hbase</td>
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<td></td>
<td>Metadata design and development</td>
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<td></td>
<td>Microservices</td>
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<td></td>
<td>Objective Caml (Ocaml)</td>
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<td></td>
<td>Oracle Coherence</td>
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<td></td>
<td>Predictive Analytics and Modeling</td>
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<td></td>
<td>Risk management</td>
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<tr>
<td></td>
<td>Security skills (DWBI, ERP, Web, project assignments)</td>
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<tr>
<td>4. Tie</td>
<td>Apache Cassandra</td>
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<td></td>
<td>Apache Pig</td>
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<td></td>
<td>Apache Spark</td>
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<td></td>
<td>Artificial Intelligence</td>
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<td>Big Data analytics</td>
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<td>Business analytics</td>
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<td>Cloudera Impala</td>
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<td></td>
<td>Configuration Management</td>
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<td></td>
<td>Continuous Improvement</td>
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<td></td>
<td>Continuous Integration</td>
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<td></td>
<td>Cryptography (encryption, VPN, SSL/TLS, Hybrids)</td>
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<td>Data Analytics</td>
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<td></td>
<td>Data Integration</td>
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<td>Data Management</td>
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<td>Data Modelling</td>
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<td>Data Quality</td>
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<td></td>
<td>Infrastructure architecture</td>
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<td>IT Governance</td>
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<td></td>
<td>Kanban</td>
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<td></td>
<td>MapReduce</td>
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<td>Master data management</td>
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<td>Penetration testing</td>
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<td>Program Management</td>
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<td>Risk</td>
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<td></td>
<td>Robotic Process Automation</td>
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<td>SAP MII (Manufacturing Integration and Intelligence)</td>
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<td></td>
<td>Scala</td>
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<td></td>
<td>Splunk</td>
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<td>Sqoop</td>
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<tr>
<td>5. Tie</td>
<td>Amazon DynamoDB</td>
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<td></td>
<td>Amazon Kinesis</td>
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<td></td>
<td>Amazon RedShift</td>
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<td></td>
<td>Apache CouchDB</td>
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<td></td>
<td>Apache Hadoop</td>
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<td>C++ /CLI</td>
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<td></td>
<td>Clojure</td>
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<tr>
<td></td>
<td>Data Science</td>
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<td></td>
<td>Data Visualization</td>
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<td>Go language (Golang)</td>
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<td></td>
<td>Information management</td>
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<td></td>
<td>Mobile security</td>
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<td></td>
<td>Network Architecture</td>
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<td>Oracle Exadata</td>
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<td></td>
<td>Project management/governance</td>
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<td>Quality management/TQM</td>
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<td></td>
<td>Quantitative Analysis/Regression Analysis</td>
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<td></td>
<td>R language</td>
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<td></td>
<td>Redis</td>
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<td></td>
<td>Smart Contract</td>
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<tr>
<td></td>
<td>Test Driven Development/Scripting</td>
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<tr>
<td></td>
<td>User Experience/Interface Design</td>
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<tr>
<td></td>
<td>Web services security</td>
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<td></td>
<td>Webtrends analytics</td>
</tr>
</tbody>
</table>

**SOURCE:** Foote Partners [IT Skills & Certifications Pay Index™](https://www.footepartners.com), 1st Quarter 2018 data edition
530 Noncertified IT Skills Reported
(new this quarter in red)

Applic. Dev. Tools/Platforms
Agile software development
Amazon Kinesis
Amazon Web Services (EC2, S3, ASW, SGS, ELB, et. al.)
Apache Ant
Apache Cloudstack
Apache Cordova
Apache Flex
Apache Hadoop
Apache Maven
Apache Lucene
Apache Spark
Apache Struts/Struts2
Apache Tomcat
Apache Zookeeper
Automated Testing
AWS CloudFormation
AWS Lambda
Bitbucket
Boost C++
Business Objects
C
C#
C++ (CLI)
CA PPM/Clarity PPM
Cerner Millennium
Clojure
Cloudera software
Cloud Foundry PaaS
Cobol
Cognos
Confluence
Cucumber
Delphi
Dxray
Eclipse
Epic Systems applications
Ethereum
F#
Git/GitHub
GitLab
Go language (Golang)
Google Kubernetes

Go
Go language (Golang)
GitLab
Git/GitHub
F#
Ethereum
Epic Systems applications
Eclipse
Drupal
Delphi
Dxray
Eclipse
Epic Systems applications
Ethereum
F#
Git/GitHub
GitLab
Go language (Golang)
Google Kubernetes

Groovy/Grails
Grunt
Hibernate
HP ALM (App. Lifecycle Mgt)
Integration Testing
iRise
Jasmine
Java SE/Java EE
JBehave
Jenkins
JIRA
JUnit
MapReduce
MATLAB
Microsoft Azure
Microsoft SQL Server Mgt Studio
Microsoft Team Foundation Server
NetWeaver
Nim
NUnit
Objective-C
Objective Cartment (OCaml)
OpenShift
Oracle Apps Developer Framework
PL/SQL
Powerbuilder
Progress 4GL/Development tools
R language
Ruby
Ruby on Rails
Saas
SAS
Scala
Scrum
Selenium
ServiceNow ITSM
SPSS
SQL
Swift
Tcl
Transact-SQL
UML (unified modeling language)
Visual Basic 6.0
Visual C++
VMware Cloud Foundry PaaS
WebSphereMQ
Xcode

SAP & Enterprise Bus. Apps.
ABAP (all modules)
Baan
Enterprise Application Integration (EAI)
IBM Sterling
J.D. Edwards /Oracle
Lawson
Microsoft Dynamics
NetWeaver
NetWeaver Portal (SAP EP)
Oracle BPM
Oracle CRM
Oracle E-Business suite
Oracle Eloqua
Oracle ERP
Oracle Financials
Oracle HFM (Hyperion Fin. Mgt)
Oracle HRMS
Oracle NetSuite
Oracle Payroll
Oracle Retail
Oracle SCM
Oracle SOA Suite
Pega
PeopleSoft (CRM/Financials/HCM)
Remedy
Salesforce
Accelerated SAP (SLM)
SAP AFIS
SAP ALE
SAP APO
SAP Auto-ID infrastructure
SAP Banking
SAP Basis Components
SAP BI Accelerator
SAP BODI
SAP Data Services (SAP BODS)
SAP BOXI
SAP BPC
SAP BPS
SAP Business One
Business performance
Capacity Planning/Management
SAP Business Workflow/Webflow
SAP CAF
SAP CAR
SAP Car (Customer Activity Repository)
SAP CA
SAP CAR
SAP CCM
SAP CE
SAP CM
SAP CO
SAP CO-PA
SAP CRM
SAP Crystal Reports
SAP CS
SAP EBP
SAP EDI
SAP EHS
SAP EPM
SAP ERP
SAP ESA
SAP Exchange Infrastructure (XI)
SAP FI (Financial Accounting)
SAP FI - CA
SAP FI – FSCM
SAP FI - Travel Management
SAP Fiori
SAP F&R
SAP FS (Insurance)
SAP GRC
SAP GTS
SAP HANA
SAP HCM (SAP HR)
SAP HCM ESS/MISS
SAP HR-PA
SAP Hybris
SAP IS-Retail
SAP IS-U (Utilities)
SAP ITS
SAP LES
SAP LO
SAP Lumira
SAP Manufacturing
SAP MDG (Master Data Governance)
SAP MDM
SAP MDX
SAP MI
SAP MM
SAP MRO
SAP MRS
SAP Netweaver Applications Server
SAP Netweaver BW (BW)
SAP MRO
SAP MRS
SAP Netweaver Applications Server
SAP Netweaver Visual Composer
SAP NWID
SAP NWDS
SAP Oil & Gas
SAP PI (NetWeaver Process Integr.)
SAP PLS
SAP PM
SAP POSDM
SAP PP
SAP PS
SAP PSCD
SAP Public Sector Management
SAP PY (Payroll)
SAP QM
SAP Service & Asset Mgt
SAP S/4HANA
SAP SCM
SAP SD
SAP SD - GTS
SAP Security
SAP SEM
SAP SM
SAP Smart Forms
SAP Solution Manager
SAP SRM
SAP TM
SAP UI5 (UI development toolkit for HTML5)
SAP Web Application Server
SAP WEBI
SAP WM
SAP WM – EWM
SAP Xeolius
Siebel
Software AG webMethods
SuccessFactors
Web Dynapro
Workday HCM

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### Web/e-Commerce Development
- Active Server Pages
- ActiveX
- Ajax
- AngularJS
- Apache Solr
- Apache web server
- Backbone.js
- CGI
- Cold Fusion MX
- Content management systems
- CSS/CSS3
- Django
- Docker
- Documentum
- Elasticsearch
- Front End Development
- Google Analytics
- Google App Engine
- Google Cloud Platform
- HTML5
- JavaBeans/EJB 3.0
- JavaFX
- HTML5
- JavaBeans/EJB 3.0
- JavaFX
- JavaScript
- Java Server Pages
- JBoss Enterprise
- Jetty
- jQuery
- JSON
- KnockoutJS
- Magento
- Magnolia
- Microsoft .NET
- Microsoft BizTalk Server
- Microsoft Commerce Server
- Microsoft Identity Integration Server
- Microsoft Internet Information Services
- Microsoft Internet Security and Acceleration Server (ISA)
- Microsoft SharePoint/SharePoint Server
- Microsoft Silverlight
- Microsoft Visual Studio
- Mobile applications development
- Mule/MuleESB
- Node.js
- Oracle Fusion
- Oracle WebLogic
- Oracle Workflow
- Perl
- PHP (all)
- Python
- React.js
- Redux
- REST
- RESTful
- Secure software development
- Sitecore CMS
- SOAP
- Social Media/Networks
- Spring Framework
- TIBCO
- UDDI
- Unibraco
- VBScript
- Video/gographics editing
- Visual Interdev
- Voice/XML
- Web collaboration appliances
- Web collaboration appliances
- Web Content Development
- Web Design/Development
- WebSphere
- WebSphere DataPower
- Wikis
- WSDL
- XAML/XACML
- XHTML MP
- XML (all variants)

### Management, Methodology and Process
- Artificial Intelligence
- Big Data Analytics
- Bioinformatics
- Business Analysis
- Business Analytics
- Business intelligence
- Business process management/ modeling/ improvement (SW/systems)
- Change management
- COBIT
- Collaboration software
- Complex Event Processing/Event Correlation
- Configuration Management
- Continuous Improvement
- Continuous Integration CRM
- Cryptography (encryption, VPN)
- Cybersecurity
- Data Acquisition and Control Systems
- Data Analytics
- Data Architecture
- Data Cleansing
- Data Governance
- Data Integration
- Data Management
- Data Modelling
- Data Quality
- Data Science
- Data Visualization
- DevOps
eDiscovery
- E-Procurement
- ERP
- Game Development
- General Data Protection Regulation (GDPR) (EU) 2016/679
- Incident Management
- Information management
- IT Governance
- ITIL V3
- Kanban
- Machine Learning
- Marketo
- Metadata design and development
- Microservices
- Microsoft SQL Server Analysis Services
- Microsoft Visio
- Network Architecture
- Penetration testing
- Predictive Analytics and Modeling
- Prescriptive Analytics
- Program Management
- QlikView
- Quality management/TQM
- Quantitative Analysis/Regression Analysis
- Requirements Engineering/Analysis
- Risk analytics/assessment
- Risk management
- Robotic Process Automation
- Security architecture and models
- SEO
- Service Management
- Six Sigma/Lean Six Sigma
- Social media analytics
- Software development lifecycle management
- Splunk
- Tableau
- Test automation
- Test Driven Development/Scripting
- TIBCO ActiveMatrix BusinessWorks
- TOGAF (Enterprise Architecture)
- User Acceptance Testing
- User Experience/Interface Design
- Usability Research/Human Factors Research
- Waterfall
- Web Analytics
- Webtrends analytics
- Zachman Framework

### Operating Systems
- AIX
- Apache Cloudstack
- CoreOS
- HP-UX
- Linux
- Mac OS X
- Mobile operating systems (iOS, Android)
- OpenStack
- Red Hat Enterprise Linux
- Solaris
- Unix (all)
- VMware vSphere
- Windows 8/7
- Windows NT
- Windows Server 2008/2003

### Database
- Amazon DynamoDB
- Apache Cassandra
- Apache CouchDB
- Apache Hive
- Azure SQL Database
- Amazon RedShift
- Base SAS
- Blockchain
- Cloudera Impala
- Couchbase Server
- Database management
- Data mining
- Data security
- DB2
database/ ose
- ETL (Extract, transform, load)
- Hbase
- Informatica
- Java Database Connectivity
- Master data management
- Microsoft Access
- Microsoft Exchange Server
- Microsoft SQL Server
- 2016/2014/2012/2008/2005
- MongoDB
- MySQL
- NoSQL
- OpenEdge ABL (Progress 4GL)
- Oracle Application Server
- Oracle Business Intelligence Enterprise Edition Plus
- Oracle Coherence
- Oracle DB 9/10g/11/12c
- Oracle Enterprise Manager
- Oracle Exadata
- Oracle Forms
- Oracle Reports
- PostgreSQL
- Redis
- Riak
- Sqoop
- Sybase Adaptive Server
- Teradata
- TIBCO Spotfire
- Visual SQL
### Systems/Networks
- Active Directory
- Ansible
- Apache Flume
- Arista
- ATM
- Business continuity and disaster recovery planning
- CA Endevor
- Chef/Opscode
- Cisco ASA
- Cisco CUCM
- Cisco ICM
- Cisco ISE/Identity Services Engine
- Cisco IPCC
- Cisco Nexus
- Cisco Prime
- Cisco UCCE
- Cisco UCCX
- Citrix XenApp
- Citrix XenServer
- Cloud architecture
- Cloud security
- DHCP
- EIGRP
- Ethernet
- Fast Ethernet
- Gigabit Ethernet (1 GgE/10 GgE)
- HP Converged System
- HP Quality Center
- HTTPS
- IaaS (Infrastructure as a Service)
- Infrastructure architecture
- Intrusion prevention/detection systems
- IPX/SPX
- Juniper
- LAN
- LTE
- Microsoft Application Virtualization
- Microsoft Hyper-V
- Microsoft SCVMM
- Microsoft Virtual Server
- Mobile device management
- Mobile security
- Multiprotocol Label Switching
- Network access control/identify mgt systems
- NAS/Network Attached Storage
- Network security management
- Novell Netware
- PaaS
- Performance Analysis/Tuning
- Performance Testing
- Puppet
- Rackspace Cloud
- Routing (e.g. OSPF)
- Salt
- SAN/Storage Area Networks
- Security skills (project-based)
- Security Information and Event Management (SIEM)
- Smart Contract
- SMTP
- SNA
- SolarWinds
- Storage virtualization/administration
- TCP/IP
- Terraform
- Tivoli
- Vagrant
- vCloud
- Virtualization (various)
- Virtual security
- VMware Server/ESX, ESXi Server
- VoIP/IP telephony
- VPN/OpenVPN
- WAN/3G/4G services
- Web services security
- Wireless Network Mgmt
- Wireless security
- Wireless sensors/RFID
- Wireline Networking/Telecomm.
- WML

### Messaging & Communications
- ActiveMQ
- Apache Camel
- Apache Kafka
- IBM Domino
- Java Messaging Service
- Message-oriented Middleware
  - (Wave, XMPP/Jabber, etc.)
- Microsoft Exchange
- Novell Groupwise
- Oracle Comm Messaging Server
- Outlook/cc:mail/variou clients
- RabbitMQ
- TIBCO Enterprise Message Service
- TIBCO Rendezvous
- Unified Communications/Messaging
Q2 2018 Trend Charts

2018 IT Skills & Certifications Volatility Index™

(Data collected through April 1, 2018)

Demand dynamics in benchmarked certified and noncertified IT skills pay
Volatility in market value for individual IT skills and certifications—defined as incidence of gains or declines over a period of time in premium pay earned by IT professionals for specific technical and business skills—continued to smooth out from January 1, 2018 to April 1, 2018 according to the latest update of Foote Partners’ long-running IT Skills and Certifications Pay Index™ of market values for tech skills. Market value is measured by tracking additional cash compensation paid to workers by their employers for specific certified and noncertified skills they possess.

### Current Quarterly Recap (data collected through April 1, 2018)

**TOTAL: All Skills and Certifications**

- 23.6% of skills and certifications (230 of 968) changed in market value in 1st Quarter 2018 compared to 23% in prior quarter
- 131 gained value and 99 declined in value

**CERTIFIED SKILLS**

- 17.3% of reported certifications (77 of 446) changed market value in 1st Quarter 2018, up from 16.7% volatility in the prior quarter.
- 46 certifications gained market value; 31 declined in value

**NONCERTIFIED SKILLS**

- 29.4% of reported skills (154 of 522) changed value in 4th Quarter 2017, down slightly from 28.9% in the prior quarter.
- 85 gained in market value; 69 declined in value

Tracking skills volatility is useful in many ways: analyzing and forecasting demand for skills; monitoring IT workforce transition; and understanding IT management decision making. In fact, we believe statistical volatility in IT skills pay offers a more complete story of true labor market conditions than salary movements and hiring behavior, among other common indicators. Important in this distinction is that skills can be segmented and benchmarked more meaningfully than jobs allowing to microanalyses.

Similar to jobs, IT skills have broad skills categories that can be tracked (e.g., security, networking, systems, database, applications development). But unlike jobs, skills pay can be pinpointed to hundreds of niches and specialization. Also, unlike most job trends analyses, within skills categories and niches are vendor-specific and vendor independent skill specializations for more granular tracking, analysis, and forecasting.

Skills and certifications volatility prior to 2008 averaged in the 14% - 19% range. Quarterly volatility in the last two years has been in the 22% to 31% range. This is an important shift that we believe signals a move that employers are taking a more long-term view to building their tech workforces for emerging technologies such as Blockchain, AI/machine, and a variety of digital solutions. Tech leaders right now are demanding more agility, faster reaction times, and more predictable execution; this is keeping volatility high as skills markets constantly adjust to meet surges in demand for specific certified and noncertified skills.

They will be able to achieve those capabilities through applying architecture principles and practices to people management. **We discuss this in greater detail earlier in this report**
VOLATILITY HIGHLIGHTS - 10 Year Trending

IT Skills and Certifications Volatility Index™ – 968 Skills and Certifications

Recent IT skills and certifications volatility trends

QUARTERLY SUMMARY

1st Quarter 2018 volatility in skills and certifications values measured 23.6%, slightly more than the 23% volatility in the prior quarter

FINDING: Overall volatility of tech skills and certifications is smoothing out after 10 years of relatively high volatility, signally a s conspicuous change in the tech labor market.

NONCERTIFIED SKILLS VOLATILITY in this quarter (29.4%) was slightly higher than the prior quarter (28.9%)

FINDING: Q1 volatility is consistent with the 28.0% average for the past 12 months.

IT CERTIFICATIONS VOLATILITY in this quarter (17.3%) was slightly higher than the prior quarter (16.7%).

FINDING: This quarter’s volatility is consistent with the 16.6 twelve-month and twenty-four months average volatility.

(Pay data supporting these charts available in the IT Skills and Certifications Pay Index™ – 2007 to 2018 quarterly data edition)
VOLATILITY HIGHLIGHTS – IT Certifications (1Q 2018 data)

Among 451 certifications surveyed, highest volatility (>20%) occurred in these segments (ranked highest to lowest):

IT Security

In segments, notable upward volatility (value gains) occurred most in these (ranked):

IT Security

In segments, notable downward volatility (value declines) occurred most in these (ranked):

IT Security

Systems Administration & Engineering

(Source: Foote Partners LLC, 2018 IT Skills & Certifications Pay Index™)
VOLATILITY HIGHLIGHTS – Noncertified IT Skills (1Q 2018 data)

VOLATILITY INDEX: How Many Noncertified IT Skills Changed Market Value in 1st Quarter 2018?

- Management/Methodology/Process: 11.2%
- Operating Systems: 32.8%
- Database: 16.9%
- Web/Commerce Development: 11.0%
- Apps Development Tools & Platforms: 16.3%
- SAP & Enterprise Business Applications: 14.8%
- Messaging and Communications: 19.7%
- Systems/Networking: 13.8%
- ALL NONCERTIFIED SKILLS SURVEYED: 29.4%

% of Noncertified Skills That Changed Market Value from Prior Quarter (Gain or Decline)

IT Skills and Certifications Volatility Index™
1Q 2018 data findings: Noncertified IT Skills

Among 530 noncertified IT skills surveyed, high volatility (>20%) occurred in these segments (ranked highest to lowest):
- Management/Methodology/Process
- Operating Systems
- Applications Development Tools and Platforms
- Web/Commerce Development
- SAP & Enterprise Business Apps
- Database
- Messaging & Communications

Within segments, notable upward volatility (value gains) occurred most in these (ranked):
- Operating Systems

Within segments, notable downward volatility (value declines) occurred most in these (ranked):
- Management/Methodology/Process
- Messaging & Communications
- Web/Commerce Development

(Source: Foote Partners LLC, IT Skills & Certifications Pay Index™)
IT Skills and Certifications Pay Index™

- Pay premiums for 981 certified and noncertified IT skills
  - Three data points for each position: 10th, 50th, 90th percentile
- Verified and validated IT skills pay data from 74,664 IT professionals at 3,188 employers in US and Canada
- Current data collected through April 1, 2018 (updated quarterly)
- Certifications Guide containing basic information about surveyed IT certifications (pre-requisites; costs; test content; lab requirements, etc.)

Pricing: $5,400-single edition. $18,335 annual subscription

Definition of IT skills premium pay

- Pay that IT workers receive for possessing high-value IT and business skills used on the job
- Given in the form of a bonus, or embedded in base salary to adjust for the presence of a dominant vendor or technology central to job performance (examples: Cisco Network Engineer, Python Software Engineer, Redhat Linux Systems Administrator, or SAP Developer.)
- Often used to adjust either base pay or total pay in situations where job title does not match actual on-the-job duties and responsibilities, and changing the job title is not an attractive option
- May be used as a reward, recruiting inducement, retention tool, or as a guide for creating consulting rate cards
ABOUT THIS RESEARCH

Foote Partners’ primary research survey for tracking IT skills and certifications pay and supply/demand volatility is the industry-leading *IT Skills and Certifications Pay Index™* (ITSCPI), launched in 1999 and updated every three months since that time. Data covering 284,660 IT professionals at 3,188 employers in 83 U.S. and Canada cities are reported for IT salaries and skills pay earned for 215 positions and 981 certified and noncertified technical and business skills. Verified and validated pay data for 74,664 IT workers has been included in the 1st Quarter 2018 data edition of the ITSCPI, compiled from data collected through April 1, 2018.

Demographics of the participating organizations for our latest update are as follows, measured most appropriately for the type of business, by revenues, assets, total premiums and operating budgets:

- 18% of participating organizations have $5 billion+ in sales/$15+ billion in total assets
- 28% of participating organizations earn more than $1 billion in annual revenues or more than $5 billion in total assets
- 46% of participating organizations have $500+ million in sales/$1+ billion in total assets/$500+ million in premiums/$500+ million operating budget (government, educational, not-for-profit)
- 54% of participating organizations fall in the SMB (small-to-medium sized business) segment, generally defined as organization under $500 million in sales.
- [Public sector] 5% have operating budgets of $500 million or more, [nonprofit/educational sectors] 4% with operating budgets $100 million to less than $500 million

**TO OBTAIN A COPY OF THE LATEST IT SKILLS AND CERTIFICATIONS PAY INDEX™**

Please visit the Foote Partners web site: [http://www.footepartners.com/itcompensation.html](http://www.footepartners.com/itcompensation.html)
Foote Partners 2018 IT Compensation Survey Product Map

Survey Demographics
- 65 US/18 Canadian cities
  (282,660 IT workers, 3,188 employers)
- 174 Europe/UK cities
  (188,075 IT workers, 2,045 employers)
- 45+ industries
- Updated continuously.

JOB FAMILIES AVAILABLE:
- Big Data
- Business Technology
- Business Applications Delivery
- Cloud Computing
- Data Analytics
- Data Management
- Data Warehousing/BI
- Database Administration
- Database Developers
- DevOps
- Digital Product Development
- e-Commerce/e-Business
- Enterprise Applications
- Enterprise infrastructure
- Epic Systems
- Help Desk
- IT Architecture
- IT Security
- Internets/intranets/extranets
- Java Developers
- Lotus Notes/Domino
- Messaging
- Mobile Computing
- - NET Developers
- Network Eng. & Operations
- Project Management
- SAP
- Six Sigma
- Software Quality Assurance
- Storage/SAN/NAS
- Systems Eng. & Operations
- Unix/NT/Linux
- Voice Engineering
- Web/I-net

Salary Reports
- by job family
- by job family clusters
- for individual jobs in selected cities

Long-form Job Descriptions
- updated continuously
- comprehensive, includes internal/external relationships key to job success; skills and certification; detailed experience factors

Short-form Job Profiles (JD excerpts)

IT Professional Salary Survey
(211 Jobs, 36 IT job families)

IT Skills & Certification Pay Index™
(981 skills/certs)

IT Salary+Skills Pay Survey Reports

IT Skills Demand and Pay Trends Report

IT Skills HOT LISTS Forecast

IT Skills Volatility Index

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ABOUT FOOTE PARTNERS

Foote Partners, LLC is an IT analyst firm and independent benchmark research organization focusing on the human capital and user (versus vendor) side of managing technology and IT value creation. A thought leader and trusted advisor to more than 4,600 employers on five continents who purchase our products and services, our company provides pragmatic forward-thinking advice and market intelligence targeting how to smartly manage tech professionals in a highly integrated business/tech hybrid environment in which virtually all private and public organizations operate their businesses.

Our products are deeply grounded in specialized proprietary data-driven statistical and empirical research, surveys, and business intelligence collected from thousands of North American employers with whom we have deep longstanding research partnerships. These partnerships have been created and supported specifically to enable unique market intelligence views and difficult-to-find decision support research on the multiple facets of IT human capital management. As a group they were selected to meet strict criteria for what we believe is the most meaningful demographic representation for IT professionals for benchmarking purposes.

Founded in 1997 and comprised of former Gartner and META Group industry analysts, McKinsey & Company, Willis/TowersWatson, and Mercer and executives, and former corporate HR, IT, and business managers and consultants, the firm’s research division publishes 100+ quarterly-updated benchmarking, analytical research and forecasting products that help employers benchmark their IT compensation, solve difficult information technology management and workforce problems, and strengthen their ability to execute complex business solutions.

Foote Partners IT workforce and compensation survey findings and analyses are featured regularly in hundreds of HR, IT and business periodicals and media sources around the globe, including Bloomberg BusinessWeek, Forbes, Fortune, Wall Street Journal, New York Times, CIO Magazine, ComputerWorld, Network World, Workday’s Journal and Workspan Magazine; and in analyst appearances on network and cable television, National Public Radio, and countless podcasts and webcasts.

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