CLARK COLLEGE

BACCALAUREATE

OF

APPLIED SCIENCE IN CYBERSECURITY

Prepared by Dwight Hughes

Dept. Chair Network Technology

Clark College

Approved by SBCTC and WSAC November 2010
Revised March 2014

COVER SHEET
STATEMENT OF NEED

Program Information

Institution Name: **Clark College**

Degree Name: **Bachelor of Applied Science in Cybersecurity** CIP Code:

Name(s) of existing technical associate degree(s) that will serve as the foundation for this program:

Degree: Network Technology AAT CIP Code: 11.0901 Year Began: **2010**

Degree: Cisco Technology AAT CIP Code: 15.0305 Year Began: **1995**

Degree: Computer Support AAT CIP Code: 15.0305 Year Began: **1995**

Proposed Start Implementation Date (i.e. Fall 2014): **Fall 2019**

Projected Enrollment (FTE) in Year One: 20 at Full Enrollment by Year: **3**

Funding Source: State FTE: ☒ Self-Support: ☐ Other: ☐

Mode of Delivery

Single Campus Delivery: **Clark College main campus, Vancouver WA**

Off-site: N/A

Distance Learning: **Some courses will be hybrid and/or online**

Statement of Need: *Please see criteria and standard sheet.* ***Page Limit: 20 pages***

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Introduction

Clark College proposes the development of a Bachelor of Applied Science (BAS) degree in Cybersecurity to meet the high demand in the local area for qualified IT (information technology) workers with baccalaureate level training in cybersecurity skillsets. Graduates of this degree program may work as network and computer systems administrators, cyber security operations center analysts, information security analysts, or computer systems analysts.

Although the field of cyber security is a new and fast emerging there are three Washington State SOC codes that correlate closely with the expected outcomes of the proposed BAS:

- Information Security Analysts (SOC Code: 15-1122)
- Network and Computer System Administrators (SOC Code: 15-1142)
- Computer Systems Analyst (SOC Code: 15-1121)

There is a strong student pipeline internally at Clark College for this proposed degree from our three longstanding Clark College IT focused AAT degrees:

- **Network Technology AAT:** Students prepare for careers as network support technicians and network administrators with knowledge in Cisco, Microsoft, Linux, and Cloud networking technologies. They install, configure and maintain data/ networks as well as diagnosing and resolving network problems.

- **Cisco Technology AAT:** Students prepare for careers as network support technicians and network administrators with knowledge in advanced Cisco and Linux network technologies. They install, configure and maintain complex data/voice/video networks as well as diagnosing and resolving network problems.

- **Computer Support AAT:** Students prepare for careers as computer support technicians and specialists who provide services and support for a company or organization. Support specialists install, configure and maintain hardware and software as well as diagnose, troubleshoot, and resolve computer-related problems.

Also, within the local area there are several associate IT degrees that would become student feeders for this proposed BAS. One of these, Mount Hood Community College in Gresham OR, is just 20 miles from Clark College and has focused their Associate degree specifically on Cyber Security. Clark College has spoken to them about the proposed BAS and they have expressed their intent to work on an articulation for their students to have a smooth transition into this proposed BAS.

The proposed BAS degree will provide graduates with a deep technical foundation in both cybersecurity and network management topics, such as: virtualization, cloud computing, mobile device management, storage area networks, information assurance, forensics, threat analysis, and vulnerability assessment. In addition to a strong technical foundation, graduates will have gained extensive experience working in teams, making presentations, and documenting the configuration of servers and networking equipment.

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Program outcomes for this proposed BAS are in process now of being refined and are pending approvals internally this fall through a vetting of several committees before finalized outcomes are provided in the Program Proposal to be submitted to SBCTC later this fall. We are sharing these preliminary outcomes for the proposed BAS, as follows:

- Plan, implement, administer, and support appropriate information technologies and systems to help an organization achieve its goals and objectives. Information technologies and systems may include: servers, client computers, mobile devices, operating systems, network applications, local area networks, wide area networks, wireless networks, network segments, intranets, and cloud.
- Analyze the security vulnerabilities of an organization's information technology resources.
- Plan and implement security measures and practices for an organization's information technology resources.
- Evaluate user needs, and then use those needs to plan the implementation of information technology systems that meet those needs.
- Prepare for industry certification exams.

Clark College proposes the development of a BAS degree in Cybersecurity for many reasons, including:

- The proposed degree supports the role, mission, and program priorities of Clark College.
- The proposed degree fully supports and advances the SBCTC mission study goals and the HECB policies and goals for higher education.
- The proposed degree will help meet the regional demand for qualified IT workers with bachelor's degrees. The current demand greatly exceeds the supply of qualified workers.
- The proposed degree builds on the technical associate degree programs in Information Technology currently offered by Clark College.
- The proposed degree will satisfy demand from students with technical associate degrees in IT from Clark College and other nearby community and technical colleges.
- The proposed degree provides place-bound students with an educational path to a nearby, affordable, and high-quality applied baccalaureate degree.

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Criteria 1: Relationship to institutional role, mission, and program priorities.

The proposed Bachelor of Applied Science degree in Cybersecurity (proposed BAS degree) reflects and supports the role, mission, and program priorities of Clark College.

The proposed BAS in Cybersecurity provides a new avenue for students to continue their information technology education within the emerging field of cybersecurity, which will open additional employment opportunities at higher wages. Paired with the opportunities for students we have seen an increase in employer demand for a workforce with a skillset in cybersecurity and the proposed BAS will be the first step in meeting this increasing demand.

Clark College Associate level and also short-term certificate programs in IT fields have a strong and longstanding partnership with local industry within our service district and in the greater Portland/Vancouver areas. Employers have been clear with us about their increasing need for cyber security skillsets. That these skillsets need to be advanced and in addition to what we are already teaching at the Associate level.

Institutional Role of Clark College
Clark College is a two-year public college that offers degrees and certificates in academic and professional and technical programs, as well as courses in continuing education and basic skills to people within our service district. The proposed BAS degree supports this role by increasing the number of professional/technical degrees offered by Clark College to individuals within its service area.

Mission of Clark College
This mission of Clark College is: "Clark College, in service to the community, guides individuals to achieve their educational and professional goals." The proposed BAS degree advances Clark College's mission by providing a high-quality applied baccalaureate degree that is in demand within Clark College's service area.

Program Priorities of Clark College
One of Clark College's core themes is Economic Vitality, "Facilitate student learning by providing programs, services, and conditions that improve the economic well-being of the students, college, and community." As information technology becomes more complex, employers are demanding a more highly educated and skilled IT (information technology) workforce. Many Clark College graduates with AAT degrees in IT are finding a significant number of job opportunities closed to them because they do not have a bachelor's degree. In response to the increasing employer demand for IT workers with bachelor's degrees and the increasing student demand for bachelor's degrees in IT, Clark College has chosen to pursue the proposed BAS degree at this time. The proposed BAS degree fully supports Clark College's program priorities by offering a new educational pathway for terminal associate degree students to gain greater skills and obtain the applied baccalaureate degree required by many employers in the information technology industry.

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Criteria 2: Support of the statewide strategic plans.

The proposed Bachelor of Applied Science (BAS) degree in Cybersecurity (proposed BAS degree) fully supports and advances the SBCTC mission study goals and the WSAC policies and goals for higher education.

SBCTC Mission Study Goals
The Mission Study of the State Board for Community and Technical Colleges outlines the focus areas for the next 20 years for colleges within Washington. Of those Mission directives, the proposed BAS in Cybersecurity directly addresses the following:

- Serve more people, including groups who have been underserved in the past.
- Close the statewide skills gap for technically trained workers.
- Contribute more to the production of baccalaureate degrees.

A BAS in Cybersecurity will provide an additional pathway to high wage jobs for place bound students in our region who have not previously had access to similar pathways. The BAS will be the first Cybersecurity program, at the bachelor's degree level, in the region and will provide technically trained workers that will fill the existing skills gap. The addition of the proposed BAS will add to the baccalaureate degree options within our service district.

The Washington State Board for Community and Technical Colleges (SBCTC) asserts that "our state's most urgent need is to educate more people to higher levels of skill and knowledge. This is the only way we can hope to sustain a prosperous economy that will provide opportunities for all of us, and for our children." The proposed BAS degree is a positive step toward meeting this goal. It provides future workers with a higher level of skill and knowledge than can could be obtained through associate level programs. Graduates will be able to use their advanced skill and knowledge to provide vital technology services for our region's businesses, governmental agencies, and non-profit organizations.

WSAC Policies and Goals: Strategic Master Plan
The goal of the Washington Student Achievement Council (WSAC) 2008 Master Plan is to raise "the overall level of educational attainment among Washington's younger citizens and under-educated adult workers." To raise educational attainment, we must "help more people achieve degrees." The proposed BAS degree supports and advances the WSAC goal of increasing the production of bachelor's degrees.

One of the long-standing objectives of Washington's strategic plans for higher education is "producing more graduates in high-employment fields such as science, technology, engineering, and mathematics." However, the WSAC notes that "there continues to be a shortage of graduates in the fields of science, technology, engineering, and mathematics." The proposed BAS degree Cybersecurity will help fill the supply and demand gap for graduates in the technology field.

Criteria 3: Employer/community demand for graduates with baccalaureate level of education proposed in the program.

The need for Cyber Security professionals is in-demand and that need is growing within the Clark College service area and within the combined Portland/Vancouver areas where Clark College is situated. As an occupation network and computer systems administrators with cyber security skillsets is expected to grow faster than average in both the short and long-term. The Bureau of Labor Statistics considers a bachelor's degree the entry-level education requirement for cyber related occupations.

The data explored in this section will demonstrate that employer and community demand for graduates with baccalaureate level training in cyber security skillsets within Clark College's service area exceeds the regional supply. The proposed Bachelor of Applied Science degree in Cybersecurity will help fill the gap between supply and demand.

Clark College with the unanimous backing and support of the Network Technology industry advisory committee has explored and assessed current and projected employer demand for cyber security workers and the need for having baccalaureate level education. We have relied upon the results of an employer survey, an employer panel discussion, and an analysis of employment and occupational data.

Employer Survey
Clark College's service area is home to many large and small businesses, governmental agencies, and nonprofit organizations. We also are in close proximity to Portland Oregon. Major private employers who hire our graduates now include: Windstream, Zayo, Fisher Investments, and Legacy Health.

Clark College conducted a survey of employers in the region to gain insight into their organizations educational preferences for their IT employees in regards to cyber security skillsets. The survey targeted businesses in the greater Vancouver WA and Portland OR areas with at least one cyber security related position within their organization. There were 38 survey respondents representing 35 employers.

The growing demand for cybersecurity professionals within our local area was demonstrated by the responses to survey question six, "How many cybersecurity positions, if any, do you anticipate having open in the next 3 years?" The response average showed a 200% growth from the number of cyber security related positions they have open today (survey question five).

Cyber security is a new and rapidly emerging field so the availability of degrees specific to cyber skills have lagged behind industry needs and many employers simply can not currently find baccalaureate level applicants with the needed cyber security skillsets.

84% of survey respondents indicated that a bachelor's degree was a preference for cybersecurity positions within their organization (survey question eight). And with no available cyber security focused baccalaureate level degree in the area it is not surprising to see that 55% of respondents had difficulty finding baccalaureate level applicants for their open cyber security positions (survey question 9). This proposed BAS would assist area organizations by providing a pipeline of qualified applicants to fill the many open positions in our area by providing a planned graduation rate of 20 students annually into the local area workforce for cyber security related positions.

> "I am for such a degree. I personally would like this option or to see more degrees like this at community colleges. There are a lot of people with the technical aptitude that cannot afford the bigger colleges and universities tuition's. Cybersecurity is one of the most growing positions in the IT arena." – Survey Participant

See Appendix A for complete employer survey results.

Employer Panel Discussion

We invited several local employers with cyber security positions in the greater Portland/Vancouver area to send a representative to an industry experts panel discussion we hosted around our Cyber Security BAS plans and what specific local employer needs are for the degree, employment demand, and cyber security skillsets.

Asked if a baccalaureate level education would have the potential to provide enough skills acquisition for students to fill entry-level cyber-security jobs the panel participants overwhelmingly indicated a cyber security focused BAS was the appropriate level for entry-level employment in cyber security related positions:

> "Yes, a four-year degree will provide students with the necessary skills for entry-level positions in cyber security…" – Tom Stroben, FasTech Solutions.

> "…many companies expect a candidate to possess a four-year degree." – Patterson Cake, Peacehealth

See Appendix E for complete minutes of the employer panel discussion (November 2017).

Traditional Labor Market Data

Within the information technology industry, the gap between the projected annual supply and demand of qualified candidates for cyber related network and computer systems administrator jobs is staggering. It is clear that the level of educational attainment in Clark College's service area must be raised to fill the substantial gap between the number of qualified candidates and the number of jobs to be filled.

The Washington State Employment Security Department reports that, in Washington state the three SOC codes related to this proposed BAS degree are listed as being in demand. And according to the Federal Bureau of Labor Statistics (BLS), "the typical level of education that most workers need to enter these three occupations is a baccalaureate degree along with additional training, experience, licenses or credentials."

- Information Security Analysts (SOC Code: 15-1122) in 2016 had 2,387 positions within the state with a 3.6% growth rate from 2016-2026. It is estimated there will be 941 position openings annually. (Updated 8/21/2018)

- Network and Computer System Administrators (SOC Code: 15-1142) in 2016 had 9,485 positions within the state with a 2.5% growth rate from 2016-2026. It is estimated there will be 3,451 position openings annually. (Updated 8/21/2018)

- Computer Systems Analyst (SOC Code: 15-1121) in 2016 had 18,760 positions within the state with a 2.9% growth rate from 2016-2026. It is estimated there will be 6,855 position openings annually. (Updated 8/21/2018)

Local Region

Local data for Southwest Washington shows that local demand (Clark, Skamania, Klickitat Counties in Washington and Multnomah, Clackamas, and Washington Counties in Oregon) for the occupations related to the BAS degree is strong (data are from Emsi, updated 9/11/2018):

- Computer Systems Analyst positions (SOC Code: 15-1121) are expected to increase 16%, from 4653 in 2018 to 5,383 in 2028.

- Information System Analyst positions (SOC Code: 15-1122) are expected to increase 31%, from 848 in 2018 to 1109 in 2028.

- Network and Computer System Administrators (SOC Code: 15-1142) are expected to increase 14%, from 2,623 in 2018 to be 2,997 positions by 2028. See Appendix B for complete Emsi occupational data for SOC 15-1142.

We reached out to Maureen Majury, Director for the Washington State SBCTC Center of Excellence for Information and Computing Technology, who provided us an Emsi report on cyber related position openings within the five counties that comprise our service area. The data showed 141 unique position openings related to cyber security within our region from September 2016 to October 2017 with Information Security Analysts as the highest openings of all positions in the report. See Appendix C for complete Emsi job posting analytics for SW Washington.

Changes in IT Industry Education Standards

Historically, employers have hired new IT employees with a technical associate degree for many IT jobs. One reason for this has been that the skillsets are changing rapidly throughout many IT occupations and educational programs often are years behind the in-demand skills employers need. Community colleges have always been in a good position to meet these changing needs.

The rapid evolution of cyber security occupations requires that new skills must be added on top of the existing associates level trainings in network and computer administration. The Bureau of Labor Statistics now states the education requirement for network and computer systems administrators as baccalaureate level. The shortage of bachelor's degree graduates in these cyber security related occupations is even greater than it appears because most computer science graduates lack skills in cyber

security and computer networking. These graduates would require significant additional education and training to be able to work in a cyber security related occupation.

The proposed BAS degree will help meet the increased demand for workers with baccalaureate degrees that has been generated by the recent increased education requirements across the IT industry due to the addition of cyber security skillsets.

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Regionally we are suffering from the old adage of the "chicken and the egg". Since we do not have any cyber security focused baccalaureate degrees in our area currently our employers are hesitant to ask for them as an employment requirement. The employer survey results reflect that local employers want applicants with a cyber security focused baccalaureate degree, 73% of respondents (survey question 10) indicated a cyber security focused baccalaureate degree would be helpful to them in finding qualified applicants.

By looking at current job postings in different regions we see where there are degree options available this shows up in the hiring requirements. A data search looking at the first five posting for "Cyber Security Analyst" at Glassdoor.com,:

- New York City: three required a baccalaureate degree; one required BA or BS, one required BS.
- Chicago: four required a baccalaureate degree; one required undergrad STEM degree.
- San Francisco: one required baccalaureate degree, one required an unspecified degree in CS or Systems Engr; three required BS.
- Seattle: two required baccalaureate degree, one required baccalaureate degree or equivalent experience; two had no educational requirement.
- Portland: one required baccalaureate degree; one required BA or BS; two required baccalaureate degree or equivalent experience; one had no educational requirement.
- Vancouver, WA (only three relevant positions found): three required baccalaureate degrees.

The major metro areas with many local/regional baccalaureate degree granting institutions (NYC, CHI, SF) all required baccalaureate degrees. This indicates that industry is likely to make a baccalaureate degree a requirement (rather than just a preference) if there is a sufficient pool of applicants who hold these degrees.

Employer Demand Exceeds Regional Supply of Graduates

Appendix F provides a complete Gap Rubric for the Southwest Washington-Portland metropolitan area. While demand is strong (as described above), the supply of baccalaureate-trained cybersecurity professionals is weak (See Criteria 5). No cybersecurity-focused baccalaureate degree options exist in the Southwest Washington-Portland metropolitan area. Washington State University-Vancouver offers bachelor's degrees in Management Information Systems (MIS) and Computer Science (CS). The WSU-Vancouver MIS department offers no courses with cybersecurity (or related terms) in their descriptions. The CS department course list includes CS 425 Computer Forensics (not offered in 2018) and CS 427 Computer Security (one section offered in Spring 2018). CS 425 and CS 427 are both elective courses (not required) for the CS Bachelors degree. Portland State University offers a bachelor's degree in CS but offers no courses with cybersecurity related terms in their descriptions. Thus, the supply of cybersecurity-focused, baccalaureate-prepared graduates in the Southwest Washington-Portland area is little to none.

Criteria 4: Applied baccalaureate program builds from existing professional and technical degree program offered by the institution.

The proposed Bachelor of Applied Science degree in Cybersecurity (proposed BAS degree) builds upon the strong foundation of three stable and longstanding Clark College Information Technology AAT degrees. The proposed BAS will build upon the skills foundations of these associates degrees and provide a stepwise pathway for those students seeking a career path in cyber security. A combination of academic and technical coursework that will prepare students for the most challenging aspects of the continuously changing cyber security IT work environment.

There is a strong student pipeline internally at Clark College for this proposed degree. Three longstanding Clark College IT focused AAT degrees will provide the primary student pipeline into this proposed BAS. These three degrees are comprised within two operational departments at the college: Computer Technology Department, and Network Technology Department, as follows:

Academic Year	# of Students
Computer Technology	
2012-2013	147
2013-2014	175
2014-2015	153
2015-2016	128
2016-2017	113
2017-2018	119
Network Technology	
2012-2013	247
2013-2014	187
2014-2015	152
2015-2016	162
2016-2017	174
2017-2018	173

Network Technology AAT: Students prepare for careers as network support technicians and network administrators with knowledge in Cisco, Microsoft, Linux, and Cloud networking technologies. They install, configure and maintain data/ networks as well as diagnosing and resolving network problems.

Cisco Technology AAT: Students prepare for careers as network support technicians and network administrators with knowledge in advanced Cisco and Linux network technologies. They install, configure and maintain complex data/voice/video networks as well as diagnosing and resolving network problems.

Computer Support AAT: Students prepare for careers as computer support technicians and specialists who provide services and support for a company or organization. Support specialists install, configure and maintain hardware and software as well as diagnose, troubleshoot, and resolve computer-related problems.

Also, within the local area there are several associate IT degrees that would potentially become student feeders for this proposed BAS. One of these, Mount Hood Community College in Gresham OR, 20 miles from Clark College, has focused their associate level degree specifically on cyber security. Clark College has spoken to them about the proposed BAS plans and they have expressed their intent to work on an articulation pathway for their students to have a smooth transition into this proposed BAS.

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The proposed BAS degree will provide graduates with a deep technical foundation in both cybersecurity and network management topics, such as: virtualization, cloud computing, mobile device management, storage area networks, information assurance, forensics, threat analysis, and vulnerability assessment. In addition to a strong technical foundation, graduates will have gained extensive experience working in teams, making presentations, and documenting the configuration of servers and networking equipment.

Each of these associate degrees provides its graduates with foundational training in a broad range of networking, security, and computer systems administration topics. Graduates from these programs are well-prepared to enter the IT workforce in an entry level position. As education requirements have increased in the industry, however, it is vital that graduates from associate's-level programs have a pathway to continue to the bachelor's level, so they can obtain more advanced positions in the industry and earn a higher level of income. The proposed BAS degree in cybersecurity is a natural extension of Clark College's associate degrees in network and computer technology.

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Criteria 5: Student demand for program within service area.

There is significant student demand for Clark College's proposed Bachelor of Applied Science degree in Cybersecurity.

The enrollment projections for the proposed BAS would use an open enrollment cohort model. Initially a new cohort of twenty students would start annually each fall term for the first two years the program is offered. It is estimated an overall attrition rate of 25%, represented by the reduced second year student enrollment numbers of fifteen students. Then, beginning in year three a second annual student cohort would be added, offset by six-months from the first student cohort. So, in effect by year four and beyond a new student cohort would start every six months. The maximum expected student enrollment would reach seventy students enrolled annually.

Student Cohort	Year 1	Year 2	Year 3	Year 4	Year 5
1	20	15			
2		20	15		
3			20	15	
4			20	15	
5				20	15
6				20	15
7					20
8					20
Enrollment =	20	35	55	70	70

Clark College Students Graduating with Technical Associates Degrees

Academic Year	# of Students
Computer Technology	
2012-2013	147
2013-2014	175
2014-2015	153
2015-2016	128
2016-2017	113
2017-2018	119
Network Technology	
2012-2013	247
2013-2014	187
2014-2015	152
2015-2016	162
2016-2017	174
2017-2018	173

Students graduating from three IT related Clark College associate degree programs would be the main student pipeline for the proposed BAS. These three associate degrees comprise the Computer Technology and Network Technology departments at the college.

Network Technology AAT: Students prepare for careers as network support technicians and network administrators with knowledge in Cisco, Microsoft, Linux, and Cloud networking technologies. They install, configure and maintain data/ networks as well as diagnosing and resolving network problems.

Cisco Technology AAT: Students prepare for careers as network support technicians and network administrators with knowledge in advanced Cisco and Linux network technologies. They install, configure and maintain complex data/voice/video networks as well as diagnosing and resolving network problems.

Computer Support AAT: Students prepare for careers as computer support technicians and specialists who provide services and support for a company or organization. Support specialists install, configure and maintain hardware and software as well as diagnose, troubleshoot, and resolve computer-related problems.

Students Graduating with Technical Associates Degrees in the Region

Clark College has longstanding relationships with its neighboring community and technical colleges and has begun conversations with several of them towards developing pathways that would their students to seamlessly transition into this proposed BAS degree.

Within the local area there are several associate IT degrees that would potentially become student feeders for this proposed BAS. One of these, Mount Hood Community College in Gresham OR, 20 miles from Clark College, has focused their associate level degree specifically on cyber security. Clark College has spoken to them about the proposed BAS plans and they have expressed their intent to work on an articulation pathway for their students to have a smooth transition into this proposed BAS.

Emsi data for other colleges besides Clark College within the six Washington counties that comprise our service area and also the greater Portland OR area (looking at all award levels: certificate, associate, bachelor) showed three related CIP codes (occupational programs) with 93 student completions in 2016. Those 2016 completions came from just three colleges, as follws:

Institution	Location	Completions	CIP Code	Award Level
Portland Community College	Portland, OR	30	11.1001	Associate
Mt. Hood Community College	Gresham, OR	23	11.1003	Certificate
Mt. Hood Community College	Gresham, OR	19	11.1003	Associate
Mt. Hood Community College	Gresham, OR	3	11.0101	Associate
Charter College	Vancouver, WA	18	11.1003	Certificate

The same Emsi data set shows the historical student completions for our area by CIP code:

Historical Student Completions for Area						
CIP Code	Program	2012	2013	2014	2015	2016
11.1003	Computer and Information Systems Security/Information Assurance	45	50	73	103	60
11.1001	Network and System Administration/Administrator	40	50	36	41	30
11.0101	Computer and Information Sciences, General	50	10	124	16	3
Total Annual Student Completions =		135	110	233	160	93

The Emsi data above shows there is no competition to our proposed BAS within our area, and a good potential for strong student feeders from the handful of associate level programs within our area.

Other Baccalaureate Degrees within the Region

The proposed BAS degree will help to satisfy the unmet student demand for cyber security focused baccalaureate degrees in the Clark College service area. There are no cyber security focused baccalaureate degree programs offered within the Clark College service district or the greater Portland OR / Vancouver WA area. Other baccalaureate degree granting institutions, mainly Portland State University and Washington State University Vancouver, have MIS (Management Information Systems) and CS (Computer Science) degrees. They are not applied skills degrees and also do not have a focus on cyber security. Looking at the course descriptions for the WSUV MIS degree there is not a single course which even mentions cyber security within the course descriptions.

Students with technical associate degrees within our area face roadblocks and limited enrollment opportunities in our service area for baccalaureate level training. Transfer students have little choice in the baccalaureate degree offerings within our area, primarily traditional MIS and CIS degrees. Students have no pathway currently from the associate degrees in IT to baccalaureate level degrees. Their transcripts are evaluated on a course- by-course basis, and typically they may lack the math and programming requirements needed to enter an MIS or CIS baccalaureate program with junior standing.

For example, Washington State University Vancouver (WSUV) is the "incumbent" university within our service area and WSUV restricts transfer credit to a maximum of just 15 credits of professional/technical courses, so many of our students transferring in with a technical associate degree may be deemed to have completed only about one year or less of the baccalaureate level programs there.

The tuition cost for Washington State University Vancouver's Bachelor of Science in Information Technology and Systems program is much higher than the tuition cost for students in an applied baccalaureate degree program at a state community college. And, a traditional MIS or CIS degree does not provide significant upper-division technical IT content that builds on prior knowledge and skills acquired at the associate's level, it does not meet the needs of students seeking to advance their technical skills in preparation for entering the workforce as cyber security professionals.

None of the traditional and baccalaureate degree programs in Information Technology within the Clark College service area and also the Portland OR area are ideal for students who want to gain employment as cyber security professionals. Clark College's proposed BAS in Cybersecurity will offer students the additional technical depth, academic rigor, and training in soft skills required by local-area employers. While building upon their prior coursework and integrating those skillsets into the BAS curriculum.

Student Interest Survey

Clark College conducted a student survey in June 2018 to determine internal student interest in the proposed BAS. This survey was distributed electronically by email only to students within the three associate degrees identified as a pipeline for the proposed BAS.

Of the 49 responses 89% of survey respondents were either interested or extremely interested when asked, "if a Bachelor of Applied Science (BAS) degree in Cyber Security was offered at Clark College, how likely would you be to enroll?" And 76% preferred courses offered in the evening or hybrid (some online and some in person courses).

When asked to identify the reasons they would pursue a Cyber Security BAS at Clark College 81% of our students wanted to add to their current job skills. While 76% of students wanted to earn a baccalaureate degree. And over 50% cited the lower cost of a baccalaureate degree through Clark College verses a university.

> "Cyber Security is actually the field I am interested in. I couldn't find a Cyber Security program in this area that qualifies for the schooling program I am currently in, so I chose to go into Computer Networking with the intention of later pursuing Cyber Security. Clark would definitely be my first choice for schooling." – Student Survey Response

See Appendix D for complete Student Interest Survey Results

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Criteria 6: Efforts to maximize state resources to serve place-bound students.

The proposed Bachelor of Applied Science degree in Cybersecurity (proposed BAS degree) will provide place-bound students in the Clark College service area access to a nearby, affordable, relevant, and high-quality applied baccalaureate degree program focused on cyber security skillsets.

There are a substantial number of place-bound students in the Clark College service area. There are very limited baccalaureate degree options within our service area, and no cyber security focused baccalaureate degree options.

Designed for Working Adults

The proposed BAS will be a "two nights a week" evening program, utilizing hybrid courses and some online courses. Students will only physically travel to Clark College for classes two evening a week: typically, students would have either a T/Th or M/W schedule. Many courses utilize extensive hands-on learning where students apply what they learn through lab work. An advanced technology lab will be open for drop in use by students six days a week, typically from 8am – 9pm. Additionally, many of the advanced technology lab assets are made available to students remotely over the Internet allowing them to accomplish many of the labs from their own homes or work eliminating the need to make additional trips to the college.

Clark College's proposed BAS degree is a superior option for place-bound students in its service area because it offers:

- Extensive stepwise lower- and upper-division technical, academic, and soft skills content.
- Ease of transferability of previously earned technical associate degrees, resulting in the shortest possible time (2 years) to baccalaureate degree completion.
- Lowest tuition costs available.
- Convenient location near main freeways and good accessibility by public transportation.
- Extensive student services for veterans, first generation and low income students, and students with disabilities.

Clark College will ensure that the proposed BAS degree has a selection and admission process consistent with an open-door institution. Clark College has developed the degree's curriculum to allow students with any one of most associate level IT degrees eligibility and aligned pathway into the proposed BAS.

Collaboration with Academic Partners

Clark College has engaged with several regional and statewide entities with regards to our proposed BAS.

The Washington SBCTC Center for Excellence for Information and Computing Technology was contacted by Dean Howard from Clark College who conferred with Maureen Majury, CoE Director, about the proposed BAS and shared with her the Statement of Need document for review. Ms. Majury provided some suggestions around the data within the Statement of Need document, she provided an Emsi data set report, and also a list of other cyber security focused BAS degrees within the state.

Statement of Need – Clark College

Green River College has been working with Clark College for many years now on the proposed BAS. Professor Hughes from Clark College has regularly conferred with professor Alan Carter from Green River College about the proposed BAS. As early as 2010 these two professors were discussing the industry needs for a cyber security related baccalaureate degree. Professor Hughes from Clark College served as an outside reviewer for the Green River BAS in Network Administration and Security. And subsequently the two schools explored Green River College expanding their BAS to use Clark College as a satellite campus location. Now in the present professor Carter from Green River College has been engaged with advising and supporting the efforts of Clark College with regard to the development of their proposed BAS.

Clark College is a member of Cyber Watch West. The center is dedicated to cyber security education in the western United States. Center director Corrine Sande from Whatcom Community College has been engaged with Clark College in that capacity. Clark College is developing their cyber security baccalaureate degree coursework to align with the NICE (Natiional Initialtive for Cybersecurity Education) Cybersecurity Workforce Framework, which defines the needed skillsets.

Mount Hood Community College in Gresham OR, 20 miles from Clark College, has focused their associate degree specifically on cyber security making it a good alignment with our proposed BAS. Professor Hughes from Clark College has spoken to them about the proposed BAS and they have expressed their intent to work with him on an articulation for their students to have a smooth transition into this proposed BAS.

Clark College Vice President of Instruction, Dr. Sachi Horback, has had conversations regarding possible collaboration and potential graduate degree pathways with Washington State University Vancouver Vice Chancellor of Academic Affairs, Dr. Renny Christopher. Those discussions are ongoing

Washington State University Vancouver has baccalaureate degrees in the more traditional computer science fields of CS and MIS. Professor Hughes from Clark College has conferred with Dr. Michael Curry, an Assistant Clinical Professor of MIS for the Carson College of Business within WSUV about the proposed BAS and shared with him the Statement of Need document for his input. Dr. Curry expressed that he would need to take more time for a thoughtful look over of the proposal and would provide his comments sometime in October 2018. His initial impression from a cursory read of the proposal was that he feared the proposed BAS would negatively impact his MIS degree enrollments there at WSUV. Professors Hughes and Curry will continue to work together throughout the development of the proposed BAS degree and explore opportunities for collaboration.

Washington State University Vice Provost for Undergraduate Education, Dr. Mary Wack, has been contacted by Clark College Associate Director for Instructional Programming & Innovation, Cathy Sherick, who provided her with the Stastement of Need and general information around the proposed BAS.

Collaboration with Local Employers

The Clark College Network Technology department has been successfully collaborating with local employers for many years. The Clark College Network Technology Advisory Committee is robust, active, and includes representatives from many local and regional businesses. The advisory committee meets several times a year to discuss courses, degrees, skill sets, and ongoing changes in the IT field. The input

from this committee ensures that Clark College continues to teach the relevant skills in demand by today's employers.

For some time, the Clark College Network Technology Advisory Committee has discussed the increasing educational requirements for new IT hires, and specifically that many employers now require a bachelor's degree for entry into the workplace. At the fall 2017 meeting, the advisory committee voted unanimously to recommend that Clark College develop a baccalaureate degree in Cybersecurity to meet the growing local employer demand for this skillset. The primary reason driving the advisory committee's decision to support the creation of this degree was the widely-acknowledged shortage of potential employees with a baccalaureate level training who have the knowledge, skills, and abilities to go to work as a cyber security professional in enterprise environments.

Unique Aspects of the Proposed BAS Degree

Clark College's proposed BAS degree has many unique aspects that set it apart:

- **Strong Technical Content**: The proposed BAS degree will have significant stepwise upper-division technical coursework in computer systems and network administration, server administration and cybersecurity topics. With input from its Network Technology Advisory Committee, Clark College ensures that its curriculum is vital, relevant, and meets employer needs.
- **Exceptional Faculty**: All full-time faculty in the Clark College Network Technology department have master's degrees, and extensive industry experience. In addition, many full- time and part-time Network Technology faculty maintain industry certifications from Microsoft, Cisco, and CompTIA. This combination of education, work experience, and industry certifications uniquely qualifies Clark College faculty to offer its students superior education and training on state-of-the art technologies.
- **Extensive IT Program Resources**: The Clark College Network Technology program is committed to maintaining extensive hardware, software, classroom, and industry association resources to facilitate hands-on learning of each of the topics included in the proposed BAS degree program. Hardware and software resources include Cisco routers and switches, multiple virtualization servers capable of hosting hundreds of virtual machines, and new desktop computers in the Network Technology classrooms. The Clark College Network Technology department maintains current industry group memberships in the Microsoft IT Academy, CompTIA Education to Careers (E2C), Red Hat, VMware, EMC, and Cisco Networking Academy.
- **Testing Centers for Industry Certifications**: Clark College maintains Pearson VUE testing center to enable students to pursue industry certifications relating to the course work they have completed in the classroom.
- **Student Run PC Repair Center**: Clark College student staffed PC repair shop on the main campus provides hands-on technical and work experience for students beyond what is available in the classroom. The repair shop provides free services to the campus and community.
- **Hands-on Learning**: Students use a variety of hardware and software in their classes to give them hands-on experience with current technologies.
- **Critical Thinking**: Problem-solving and critical thinking are emphasized throughout the curriculum to enable students to plan, implement, and troubleshoot various hardware and software solutions in simulated real-world environments.

- **Soft Skills**: Teamwork, communications, and presentation skills are integrated into the curriculum to help students master these difficult skills that are in high demand in the IT workforce.
- **Strong Links to Industry**: Many Clark College Network Technology courses are taught by instructors who currently work in the IT industry. These instructors ensure that students are exposed to current industry best practices, technologies, and standards.
- **Extensive Student Services**: Clark College students have access to many high-quality student services, including: library, veteran's services, and student support services for first generation and/or economically disadvantaged students and students with disabilities.
- **Campus Services for Place-Bound Students**: Clark College recognizes the challenges faced by place-bound students, who, due to family, work, or economic reasons are not able to travel or move to another area to obtain their education. Clark College goes to great lengths to help students succeed and provides numerous resources including a child care facility, extensive financial aid, links to public transportation, counseling, and classes at convenient times for working students.

Statement of Need – Clark College

Conclusion

Clark College proposes the development of a Bachelor of Applied Science BAS degree in Cybersecurity.

The proposed BAS degree:

- Supports the role, mission, and program priorities of Clark College.
- Supports and advances the SBCTC mission goals and the WSAC policies and goals for higher education.
- Will help meet the regional demand for qualified IT workers with baccalaureate degrees focused on cyber security skillsets.
- Will be the only baccalaureate degree option focused on cyber security anywhere within the greater Southwest Washington and the Portland OR areas.
- Is a natural extension of the existing AAT degrees in Information Technology currently offered by Clark College.
- Will satisfy demand from students with technical associate degrees in IT from Clark College and other nearby community and technical colleges.
- Provides place-bound students with an educational path to a nearby, affordable, and high-quality applied baccalaureate degree focused on cyber security.

Q1 Your Name:

Answered: 38 Skipped: 0

#	RESPONSES	DATE
1	Vin	9/6/2017 11:56 AM
2	Ben Menesi	9/5/2017 11:54 PM
3	Ian Boyd	9/5/2017 7:53 PM
4	Adam Wilkinson	9/5/2017 6:46 PM
5	Justen Martian	9/5/2017 5:59 PM
6	James Muir	8/24/2017 10:40 AM
7	Scott McDaniel	8/17/2017 1:45 PM
8	Michael Zinni	8/17/2017 12:24 PM
9	Ramses murillo	8/16/2017 8:36 PM
10	Tristan Colo	8/15/2017 10:57 PM
11	Gary Liberman	8/15/2017 1:51 PM
12	Steve Bohling	8/15/2017 12:54 PM
13	John Jenkins	8/15/2017 12:49 PM
14	Aleksandr Brikez	8/11/2017 1:43 PM
15	John Warren	6/19/2017 10:46 AM
16	Shawn Cismar	6/3/2017 9:55 AM
17	David Loney	6/2/2017 9:23 PM
18	David Baumer	6/1/2017 9:33 AM
19	Ramses	5/26/2017 11:00 PM
20	Matthew Kutchins	5/26/2017 8:45 PM
21	Kevin Colo	5/26/2017 5:37 PM
22	Jeff Groff	5/26/2017 1:50 PM
23	Brad Hoek	5/25/2017 5:03 PM
24	Randy Klug	5/23/2017 7:08 PM
25	Branden Hudson	5/23/2017 5:11 AM
26	Ian Boyd	5/22/2017 7:28 PM
27	Andrew grimes	5/22/2017 5:41 PM
28	Chris Hale	5/22/2017 4:59 PM
29	Shaun Simpson	5/22/2017 4:29 PM
30	Eric Olmsted	5/22/2017 3:24 PM
31	Rayan Sreshta	5/22/2017 2:33 PM
32	Gregory Pratt	5/22/2017 11:56 AM
33	Michael Connelly	5/22/2017 11:31 AM
34	Ryan Fanning	5/22/2017 11:29 AM
36	Justin O'Sullivan	5/22/2017 10:35 AM
37	Bobbye Archer	5/22/2017 10:24 AM
38	Tristan Colo	5/22/2017 10:08 AM

Q2 Your Position:

Answered: 38 Skipped: 0

#	RESPONSES	DATE
1	Head of Data Enabled & IoT Services	9/6/2017 11:56 AM
2	VP International & Principal Cyber Security consultant	9/5/2017 11:54 PM
3	Network Technician	9/5/2017 7:53 PM
4	Programmer/Administrator	9/5/2017 6:46 PM
5	Hardware Maintenance Tech	9/5/2017 5:59 PM
6	Technical support representative	8/24/2017 10:40 AM
7	Director of Technology	8/17/2017 1:45 PM
8	Regional IT Specialist	8/17/2017 12:24 PM
9	Security administrator	8/16/2017 8:36 PM
10	Network Engineer	8/15/2017 10:57 PM
11	Director Customer Support	8/15/2017 1:51 PM
12	Lead Systems Engineer	8/15/2017 12:54 PM
13	IT Specialist	8/15/2017 12:49 PM
14	Network Engineer	8/11/2017 1:43 PM
15	Security Engineer	6/19/2017 10:46 AM
16	Network Engineer	6/3/2017 9:55 AM
17	Director of IT Operations	6/2/2017 9:23 PM
18	Trouble Res Tech II	6/1/2017 9:33 AM
19	Security administrator	5/26/2017 11:00 PM
20	Sr. Security Engineer	5/26/2017 8:45 PM
21	Manager of Network, Telecom, & Data Center	5/26/2017 5:37 PM
22	System Manager	5/26/2017 1:50 PM
23	IT Manager	5/25/2017 5:03 PM
24	IT Consultant	5/23/2017 7:08 PM
25	Director, I.T.	5/23/2017 5:11 AM
26	Network Technician	5/22/2017 7:28 PM
27	Sr manager, IT/DevOps	5/22/2017 5:41 PM
28	Network Operations Center & Project Implementation Manager	5/22/2017 4:59 PM
29	IT Manager, Operations Vancouver	5/22/2017 4:29 PM
30	President	5/22/2017 3:24 PM
31	Trouble Resolution Specialist III	5/22/2017 2:33 PM
32	Network Implementation Engineer	5/22/2017 11:56 AM
33	Service Assurance Technician 3	5/22/2017 11:31 AM
36	Senior Unified Communications Engineer	5/22/2017 10:35 AM
37	IT Support Technician	5/22/2017 10:24 AM
38	IT Technician	5/22/2017 10:08 AM

Q3 Your Organization:

Answered: 38 Skipped: 0

#	RESPONSES	DATE
1	Philips Lighting	9/6/2017 11:56 AM
2	Unioffice	9/5/2017 11:54 PM
3	Avamere Health Services	9/5/2017 7:53 PM
4	SEH America	9/5/2017 6:46 PM
5	Evergreen Public Schools	9/5/2017 5:59 PM
6	Core Health and Fitness	8/24/2017 10:40 AM
7	Battle Ground Public Schools	8/17/2017 1:45 PM
8	Federal Railroad Administration	8/17/2017 12:24 PM
9	Conmet	8/16/2017 8:36 PM
10	ProCirrus Technologies	8/15/2017 10:57 PM
11	Care and Repair	8/15/2017 1:51 PM
12	Clark Public Utilities	8/15/2017 12:54 PM
13	Lifeline Connections	8/15/2017 12:49 PM
14	Intel	8/11/2017 1:43 PM
15	ESCO Corp.	6/19/2017 10:46 AM
16	Contractor (Daimler)	6/3/2017 9:55 AM
17	Cambia Health Solutions	6/2/2017 9:23 PM
18	Windstream	6/1/2017 9:33 AM
19	Conmet	5/26/2017 11:00 PM
20	Structured Communications Systems, Inc	5/26/2017 8:45 PM
21	Large Camas Private Employer	5/26/2017 5:37 PM
22	Clark Public Utilities	5/26/2017 1:50 PM
23	Murraysmith	5/25/2017 5:03 PM
24	Proative Network Technology, INC	5/23/2017 7:08 PM
25	Milestone Retirement Communities	5/23/2017 5:11 AM
26	Avamere Health Services	5/22/2017 7:28 PM
27	Learning.com	5/22/2017 5:41 PM
28	Sterling Communications	5/22/2017 4:59 PM
29	Ontario Systems	5/22/2017 4:29 PM
30	On Line Support, Inc.	5/22/2017 3:24 PM
31	Windsstream	5/22/2017 2:33 PM
36	CDW	5/22/2017 10:35 AM
37	McCoy Freightliner	5/22/2017 10:24 AM
38	Atmosera	5/22/2017 10:08 AM

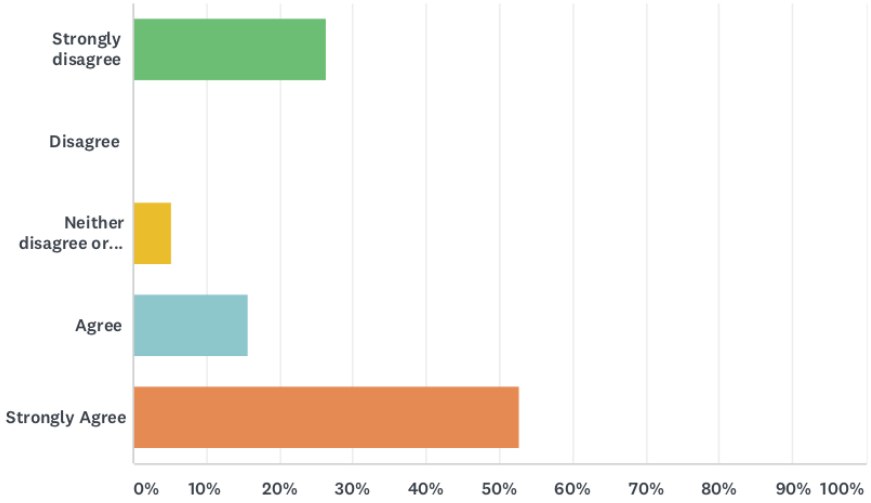
Employer Survey Results – Location Information for Survey Respondants

Orgnaization	Address
Phillips Lighting	Northern Illuminations 17400 SW Upper Boones Ferry Road, Portland, OR 97224
Unioffice	Consultant (no local physical location)
Avamere Health Services	801 SE Park Crest Avenue, Vancouver, WA 98683
SEH America	4111 NE 112th Avenue, Vancouver, WA 98682
Evergreen Public Schools	13501 NE 28th Street, Vancouver, WA 98682
Core Health and Fitness	4400 NE 77th Avenue, Vancouver, WA 98662
Battle Ground Public Schools	11104 NE 149th Street, Brush Prairie, WA 98606
Federal Railroad Administration	500 Broadway, Suite 240, Vancouver, WA 98660
Conmet	5701 SE Columbia Way, Vancouver, WA 98661
ProCirrus Technologies	9330 NE Vancouver Mall Drive, Suite 100, Vancouver, WA 98662
Care and Repair	Couldn't find any information
Clark Public Utilities	8600 NE 117th Avenue, Vancouver, WA 98662
Lifeline Connections	1601 E 4th Plain Blvd., Bldg. 17, Suite A212, Vancouver, WA 98661
Intel	6397 NE Evergreen Pkwy, Hillsboro, OR 97124
ESCO Corporation	2141 NW 25th Avenue, Vancouver, WA 98660
Contractor (Daimler)	4747 N Channel Avenue, Portland, OR 97217
Cambia Health Solutions	100 SW Market Street, Portland, OR 97201
Windstream	4380 SW Macadam Avenue #295, Portland, OR 97239
Conmet	Duplicate

Structured Communications Systems, Inc.	12901 SE 97th Avenue #400, Clackamas, OR 97015
Large Camas Private Employer	???
Clark Public Utilities	1200 Fort Vancouver Way, Vancouver, WA 98663
Murraysmith	888 SW 5th Avenue #1170, Portland, OR 97204
Proactive Network Technologies, Inc.	713 NE 4th Avenue, Camas, WA 98607
Milestone Retirement Communities	105, 201 NE Park Plaza Drive, Vancouver, WA 98684
Avamere Health Services	25115 SW Parkway Avenue B, Wilsonville, OR 97070
Learning.com	1620 SW Taylor Street #100, Portland, OR 97205
Sterling Communications	14945 SW Sequoia Pkwy, Portland, OR 97224
Ontario Systems	3300 NE 77th Avenue #100, Vancouver, WA 98662
On Line Support, Inc.	11802 NE 65th Street #101, Vancouver, WA 98662
Windstream	Duplicate (only one location)
Earthlink (now Windstream)	3000 Columbia House Blvd #106, Vancouver, WA 98661
Allstream	6058 NE 78th Court, Portland, OR 97218
University of Western States	2900 NE 132nd Avenue, Portland, OR 97230
The Columbian Publishing Company	701 West 8th Street, Vancouver, WA 98660
CDW	10900 NE 8th Street, Suite 1660, Bellevue, WA 98004
McCoy Freightliner	9622 NE Vancouver Way, Portland, OR 97211
Atmosera	9705 SW Sunshine Court, Beaverton, OR 97005

Q4 I have a favorable impression of Clark College's ability to produce qualified graduates for employment in my organization.

Answered: 38 Skipped: 0



ANSWER CHOICES	RESPONSES	
Strongly disagree	26.32%	10
Disagree	0.00%	0
Neither disagree or agree	5.26%	2
Agree	15.79%	6
Strongly Agree	52.63%	20
TOTAL		38

Q5 How many cybersecurity positions, if any, do you currently have open?

Answered: 37 Skipped: 1

#	RESPONSES	DATE
1	a few	9/6/2017 11:56 AM
2	1	9/5/2017 11:54 PM
3	0	9/5/2017 7:53 PM
4	0	9/5/2017 6:46 PM
5	0	9/5/2017 5:59 PM
6	None	8/24/2017 10:40 AM
7	None at this point but is included as an area of responsibility for network team of 4.	8/17/2017 1:45 PM
8	10	8/17/2017 12:24 PM
9	None	8/16/2017 8:36 PM
10	1	8/15/2017 10:57 PM
11	0	8/15/2017 1:51 PM
12	0	8/15/2017 12:54 PM
13	0	8/15/2017 12:49 PM
14	0	6/19/2017 10:46 AM
15	0	6/3/2017 9:55 AM
16	3	6/2/2017 9:23 PM
17	unknown	6/1/2017 9:33 AM
18	0	5/26/2017 11:00 PM
19	1	5/26/2017 8:45 PM
20	2	5/26/2017 5:37 PM
21	None	5/26/2017 1:50 PM
22	0	5/25/2017 5:03 PM
23	0	5/23/2017 7:08 PM
24	0	5/23/2017 5:11 AM
25	0	5/22/2017 7:28 PM
26	0	5/22/2017 5:41 PM
27	0	5/22/2017 4:59 PM
28	0	5/22/2017 4:29 PM
29	All of our technical staff needs cyber security knowledge.10 employees need this.	5/22/2017 3:24 PM
30	2	5/22/2017 2:33 PM
31	Not sure. We have a team however that tackles this area!	5/22/2017 11:56 AM
32	None	5/22/2017 11:31 AM
35	3 or more in just the local Portland/Seattle area	5/22/2017 10:35 AM
36	0. We are a multifunctional department	5/22/2017 10:24 AM
37	3	5/22/2017 10:08 AM

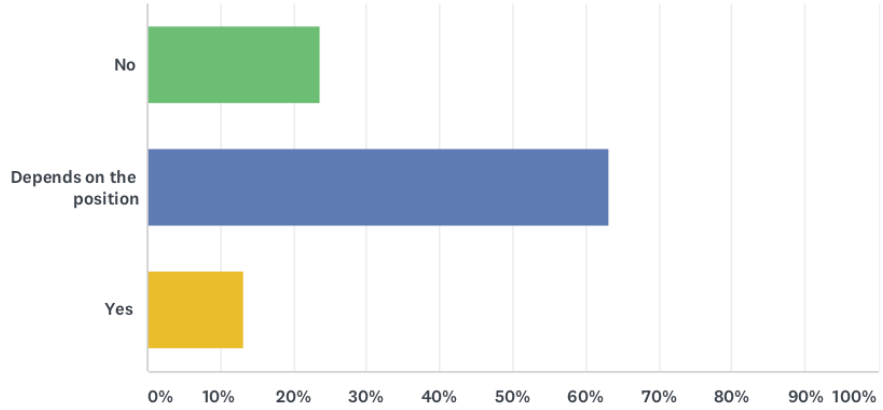
Q6 How many cybersecurity positions, if any, do you anticipate having open in the next 3 years?

Answered: 37 Skipped: 1

#	RESPONSES	DATE
1	few x 4	9/6/2017 11:56 AM
2	2-5	9/5/2017 11:54 PM
3	1	9/5/2017 7:53 PM
4	1-2	9/5/2017 6:46 PM
5	Not sure	9/5/2017 5:59 PM
6	None	8/24/2017 10:40 AM
7	Unknown see above.	8/17/2017 1:45 PM
8	unknown	8/17/2017 12:24 PM
9	1	8/16/2017 8:36 PM
10	6	8/15/2017 10:57 PM
11	5-15	8/15/2017 1:51 PM
12	1 or 2	8/15/2017 12:54 PM
13	0	8/15/2017 12:49 PM
14	2	6/19/2017 10:46 AM
15	unknown	6/3/2017 9:55 AM
16	5	6/2/2017 9:23 PM
17	unknown	6/1/2017 9:33 AM
18	2	5/26/2017 11:00 PM
19	10 or more	5/26/2017 8:45 PM
20	6	5/26/2017 5:37 PM
21	Unknonw, potentially 2 to 3	5/26/2017 1:50 PM
22	0	5/25/2017 5:03 PM
23	1 to 3	5/23/2017 7:08 PM
24	1	5/23/2017 5:11 AM
25	2	5/22/2017 7:28 PM
26	1	5/22/2017 5:41 PM
27	3-5	5/22/2017 4:59 PM
28	1	5/22/2017 4:29 PM
29	2 per year	5/22/2017 3:24 PM
30	4	5/22/2017 2:33 PM
35	It's a constantly growing number and there are already a large number of positions nationwide	5/22/2017 10:35 AM
36	Not sure	5/22/2017 10:24 AM
37	6-8	5/22/2017 10:08 AM
34	2	5/22/2017 11:28 AM

Q7 Is a bachelor's degree a requirement for a cybersecurity position in your organization?

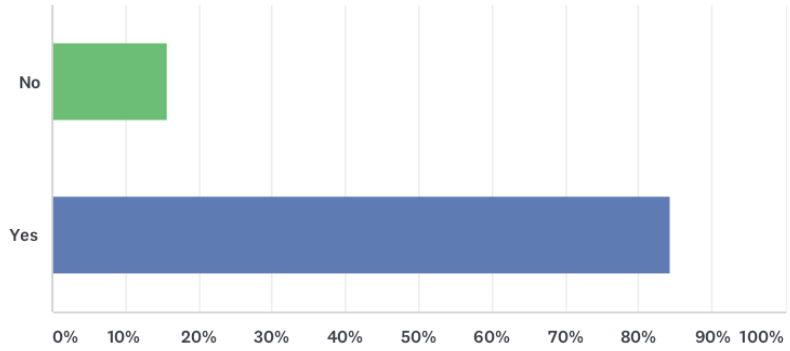
Answered: 38 Skipped: 0



ANSWER CHOICES	RESPONSES	
No	23.68%	9
Depends on the position	63.16%	24
Yes	13.16%	5
TOTAL		38

Q8 Is a bachelor's degree a preference for a cybersecurity position in your organization?

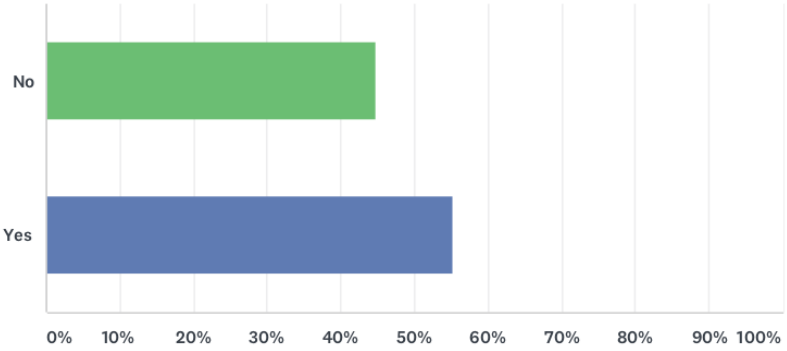
Answered: 38 Skipped: 0



ANSWER CHOICES	RESPONSES	
No	15.79%	6
Yes	84.21%	32
TOTAL		38

Q9 Do you have difficulty finding bachelor's degree level applicants for this position?

Answered: 38 Skipped: 0

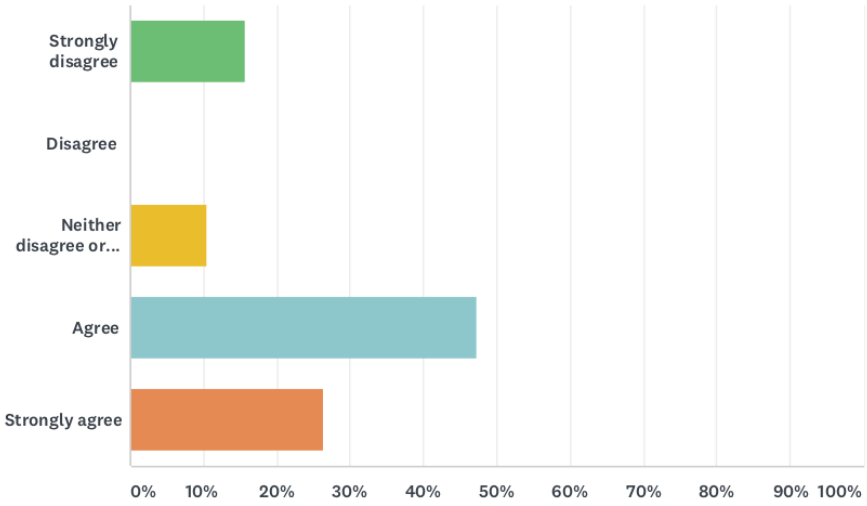


ANSWER CHOICES	RESPONSES	
No	44.74%	17
Yes	55.26%	21
TOTAL		38

#	IF YES, PLEASE EXPLAIN.	DATE
1	open question .. if you mean finding enough bachelor degree level applicants that is only a subset of the problem. I think if someone has experience the degree is secondary to me - experience and passion win. Security positions are always hard to fill and yes degrees do help in ensuring academic high quality candidates but don't think that is a 100% gate.	9/6/2017 11:56 AM
2	A lot of the positions in IT or engineering that have to do with computers are filled by people with experience, not always with a degree.	9/5/2017 6:46 PM
3	There are people with certificates but the industry needs well rounded professionals	8/16/2017 8:36 PM
4	Not many people in this field have a BAS in Cybersecurity	8/15/2017 10:57 PM
5	We have trouble finding the combination of both bachelor degree applicants and real world cyber experience.	8/15/2017 12:54 PM
6	Most people have experience rather then degree's	6/1/2017 9:33 AM
7	A bachelor's degree isn't a requirement but having a bachelor's does indeed make it known that the candidate should be able to write eloquently and succinctly.	5/26/2017 8:45 PM
8	Most learn on the job	5/26/2017 5:37 PM
9	Most applicants are Associate level	5/23/2017 5:11 AM
10	Not any programs available	5/22/2017 2:33 PM
11	This is an evoling and growing field!	5/22/2017 11:56 AM
12	Tight/sparse candidate pool.	5/22/2017 11:31 AM
13	The specific applied technology degree is not commonly seen as opposed to more general computer science programs	5/22/2017 10:35 AM

Q10 A Bachelor's of Applied Science (BAS) Degree in Cybersecurity would assist our organization in finding qualified applicants to fill the position(s).

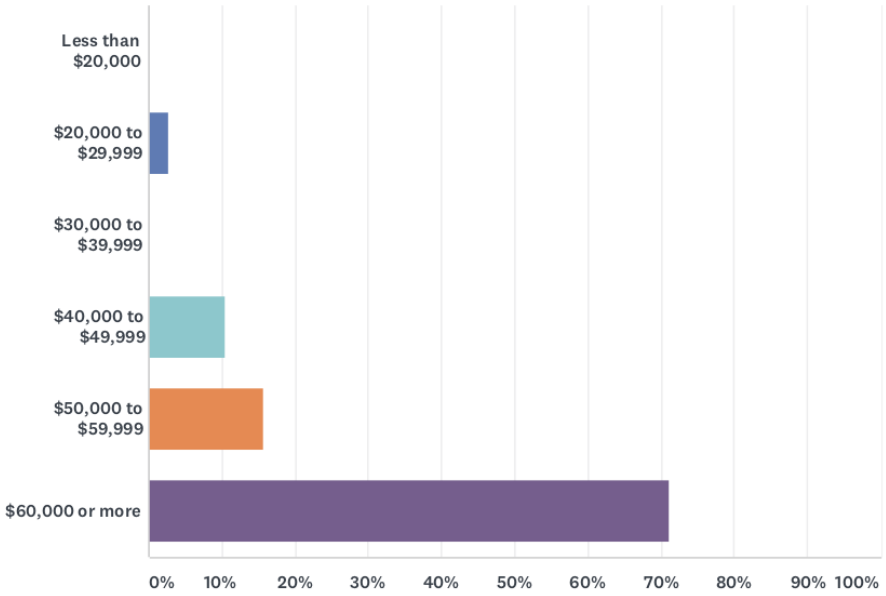
Answered: 38 Skipped: 0



ANSWER CHOICES	RESPONSES	
Strongly disagree	15.79%	6
Disagree	0.00%	0
Neither disagree or agree	10.53%	4
Agree	47.37%	18
Strongly agree	26.32%	10
TOTAL		38

Q11 What annual salary would you anticipate for a person in a cybersecurity position in your organization?

Answered: 38 Skipped: 0



ANSWER CHOICES	RESPONSES	
Less than $20,000	0.00%	0
$20,000 to $29,999	2.63%	1
$30,000 to $39,999	0.00%	0
$40,000 to $49,999	10.53%	4
$50,000 to $59,999	15.79%	6
$60,000 or more	71.05%	27
TOTAL		38

Q12 Please provide any comments, questions or concerns that Clark College should consider when creating this Bachelor of Applied Science Degree in Cybersecurity to meet the needs of your organization.

Answered: 14 Skipped: 24

#	RESPONSES	DATE
1	Don't approach this old school. Think new. Think IoT that is the new challenge. It's not the stoic stuffy security position anymore - you need someone who understands how people really use apps, devices and think about back office security in a different way from that. I don't think you can create a program that pre-loads both and in 4 years create a snap fit. Security is too broad for that. Make it a minor degree compounded areas of interest as a major.	9/6/2017 11:56 AM
2	I've taken a lot of the Cisco classes through Clark and the mostly online aspect that they use would be great for a cyber security degree. Also the staff that I've dealt with at Clark in programming, and networking classes are top notch. If this was offered, I have no doubt that there would be top quality graduates coming out of the program.	9/5/2017 6:46 PM
3	I am a graduate from Clark college and I value what that education has done for my career personally. This degree can be a source for cyber security professionals needed in vancouver and Portland Oregon .	8/16/2017 8:36 PM
4	Our cyber positions are nationwide, though the position could be housed in our Vancouver office.	8/15/2017 1:51 PM
5	While we have a great need for the skill-set we are a small staff of one that does it all. Having said that, I do reach out to skilled contractors to assist with complicated issues.	8/15/2017 12:49 PM
6	-parallel certifications - minimum of CISSP, potentially SAN GIAC -Cloud security (authentication, cloud service exposure) should be part of the coursework.	6/19/2017 10:46 AM
7	Yes, consider web security application testing, pen testing for perimeter, scripting classes, siem, log aggregation and correlation, regex patter identification, compliance and cloud security. Firewalls etc.	5/26/2017 11:00 PM
8	In this day in Age, Cyber security is becoming more and more important. It is important to consider cybersecurity from the standpoint of what a breach means and what a network assessment and penetration test as well as many routes such as social engineering tests, as well as how Phishing can be used for attack vectors. it is also important that the degree in cyber security should be vendor agnostic or should be multi-vendor disciplined to provide the candidate with a wide variety of experiences.	5/26/2017 8:45 PM
9	I am for such a degree. I personally would like to option or to see more degrees like this at community colleges. There are a lot of people with the technical aptitude that cannot afford the bigger colleges and universities tuition's. Cybersecurity is one of the most growing positions in the IT arena.	5/25/2017 5:03 PM
10	We are a small company and we store very little private information on our customers. Even though both risk level is low with us, our customers are demanding more security practices be put in place if we are to continue to do business with them. Because our needs are growing in this area, we know employ a security specialist.	5/22/2017 5:41 PM
11	Great addition to the network technology program at Clark.	5/22/2017 11:31 AM
12	As a conerstone of Higher Ed in the area it is very exciting that Clark College might offer this degree.	5/22/2017 11:29 AM
13	Dwight Hughes at the helm of any program like this is a very smart move for the students of Clark College. I went through the newly created Applied Associates in Technology - Cisco Network Administrator degree and that gave me an incredibly sharp upward tragectory in my career. This is the right move to create this program as Cyber Security is incredibly hot and the supply of knowledgeable candidates is very low.	5/22/2017 10:35 AM
14	Our IT department consists of 2 people, and about 200 end users. We take on all aspects of our IT realm. I think this is an amazing opportunity, though. I would definitely be interested in it myself.	5/22/2017 10:24 AM

Occupation Overview

Emsi Q2 2018 Data Set

April 2018

Clark College

1933 Fort Vancouver Way
Vancouver, Washington 98663

Parameters

Occupations

Code	Description
15-1142	Network and Computer Systems Administrators

Regions

Code	Description
41005	Clackamas County, OR
41051	Multnomah County, OR
41067	Washington County, OR
53011	Clark County, WA
53039	Klickitat County, WA
53059	Skamania County, WA

Timeframe

-

Datarun

2018.2 – QCEW Employees

Network and Computer Systems Administrators in 6 county area

Network and Computer Systems Administrators (SOC 15-1142): Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. May supervise computer user support specialists and computer network support specialists. May administer network security measures. Excludes "Information Security Analysts"(15-1122), "Computer User Support Specialists" (15-1151), and "Computer Network Support Specialists" (15-1152).

Sample of Reported Job Titles: Wide Area Network Administrator (WAN Administrator)Server AdministratorNetwork ManagerNetwork CoordinatorLocal Area Network Administrator (LAN Administrator)Telecommunications AnalystTechnical Support SpecialistTechnical SpecialistSystems OperatorSystems Administrator

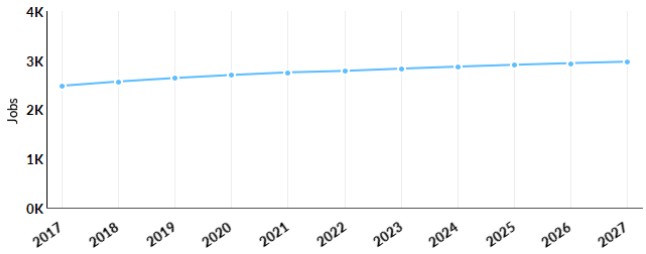
Related O*NET Occupation: Network and Computer Systems Administrators (15-1142.00)

Occupation Summary for Network and Computer Systems Administrators

2,480	19.8%	$37.61/hr
Jobs (2017)	**% Change (2017-2027)**	**Median Hourly Earnings**
17% below National average	Nation: 11.8%	Nation: $38.32/hr

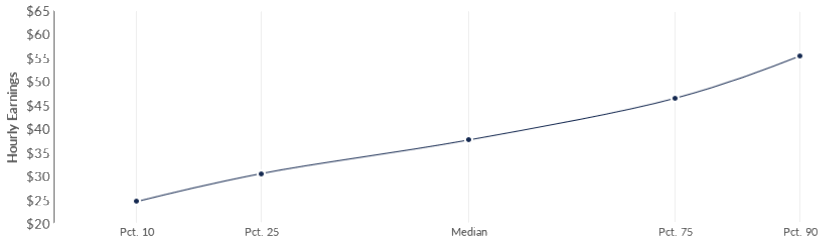
Growth for Network and Computer Systems Administrators (15-1142)

2,480	2,971	491	19.8%
2017 Jobs	2027 Jobs	Change (2017-2027)	% Change (2017-2027)

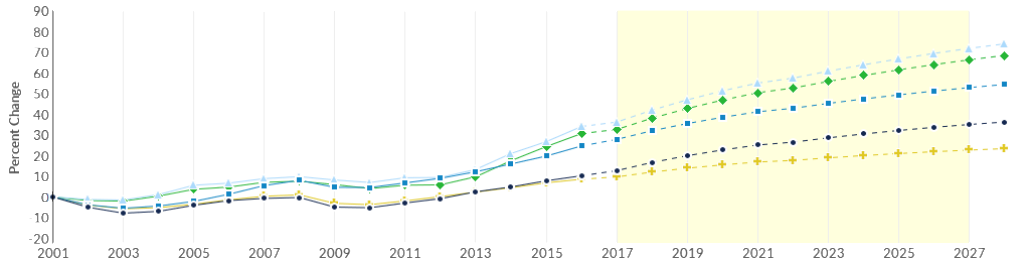


Percentile Earnings for Network and Computer Systems Administrators (15-1142)

$30.52/hr	$37.61/hr	$46.46/hr
25th Percentile Earnings	Median Earnings	75th Percentile Earnings

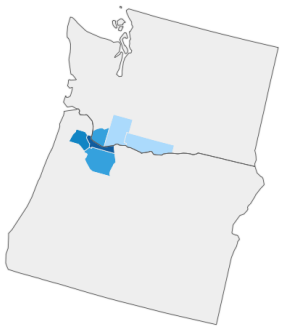


Regional Trends



	Region	2017 Jobs	2027 Jobs	Change	% Change
!	Region	2,480	2,971	491	19.8%
!	WA State	9,403	11,242	1,839	19.6%
!	service region	391	494	103	26.3%
!	SWWA WDA	434	544	110	25.3%
!	Nation	383,289	428,574	45,285	11.8%

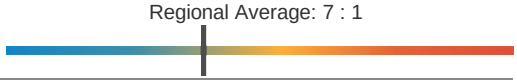
Regional Breakdown



County	2027 Jobs
Multnomah County, OR	1,279
Washington County, OR	867
Clark County, WA	477
Clackamas County, OR	330
Klickitat County, WA	14

Job Postings Summary

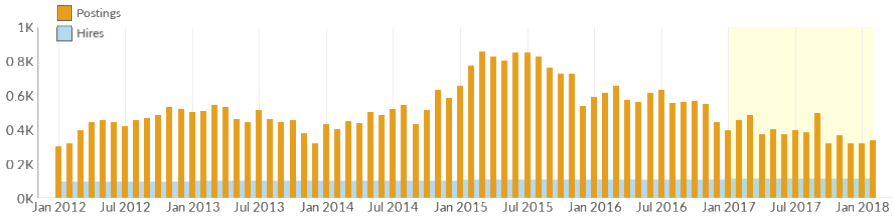
5,397	5 : 1
Unique Postings (Jan 2017 - Feb 2018)	**Posting Intensity (Jan 2017 - Feb 2018)**
26,863 Total Postings	Regional Average: 7 : 1



There were **26,863** total job postings for your selection from January 2017 to February 2018, of which **5,397** were unique. These numbers give us a Posting Intensity of **5-to-1**, meaning that for every 5 postings there is 1 unique job posting.This is lower than the Posting Intensity for all other occupations and companies in the region (7-to-1), indicating that they may not be trying as hard to hire for this position.

Job Postings vs. Hires

386	110
Avg. Monthly Postings (Jan 2017 - Feb 2018)	Avg. Monthly Hires (Jan 2017 - Feb 2018)



Occupation	Avg Monthly Postings (Jan 2017 - Feb 2018)	Avg Monthly Hires (Jan 2017 - Feb 2018)
Network and Computer Systems Administrators	386	110

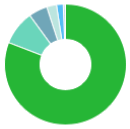
Occupation Gender Breakdown

	Gender	2017 Jobs	2017 Percent
!	Males	2,003	80.7%
!	Females	478	19.3%

Occupation Age Breakdown

	Age	2017 Jobs	2017 Percent
!	14-18	4	0.2%
!	19-24	87	3.5%
!	25-34	703	28.4%
!	35-44	811	32.7%
!	45-54	562	22.6%
!	55-64	276	11.1%
!	65+	38	1.5%

Occupation Race/Ethnicity Breakdown



	Race/Ethnicity	2017 Jobs	2017 Percent
!	White	2,007	80.9%
!	Asian	227	9.2%
!	Hispanic or Latino	123	5.0%
!	Two or More Races	65	2.6%
!	Black or African American	44	1.8%
!	American Indian or Alaska Native	9	0.4%
!	Native Hawaiian or Other Pacific Islander	6	0.2%

National Educational Attainment

	Education Level	2017 Percent
!	Less than high school diploma	0.4%
!	High school diploma or equivalent	7.2%
!	Some college, no degree	23.3%
!	Associate's degree	15.1%
!	Bachelor's degree	40.7%
!	Master's degree	12.0%
!	Doctoral or professional degree	1.2%

Occupational Programs

3	93	203
Programs (2016)	Completions (2016)	Openings (2016)

CIP Code	Program	Completions (2016)
11.1003	Computer and Information Systems Security/Information Assurance	60
11.1001	Network and System Administration/Administrator	30
11.0101	Computer and Information Sciences, General	3

Industries Employing Network and Computer Systems Administrators

Industry	Occupation Jobs in Industry (2017)	% of Occupation in Industry (2017)	% of Total Jobs in Industry (2017)
Corporate, Subsidiary, and Regional Managing Offices	324	13.1%	0.8%
Computer Systems Design Services	171	6.9%	2.4%
Custom Computer Programming Services	139	5.6%	2.4%
Local Government, Excluding Education and Hospitals	88	3.6%	0.2%
Wired Telecommunications Carriers	86	3.5%	2.1%

Appendix A - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Emsi earnings by industry.

CareerBuilder/Emsi Job Postings

Job postings are collected from various sources and processed/enriched by Careerbuilder to provide information such as standardized company name, occupation, skills, and geography. Emsi performs additional filtering and processing to improve compatibility with Emsi data.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

State Data Sources

This report uses state data from the following agencies: Oregon Employment Department, Oregon Labor Market Information System; Washington State Employment Security Department, Labor Market and Economic Analysis Branch

Job Posting Analytics

Emsi Q3 2018 Data Set

August 2018

Bellevue College

3000 Landerholm Circle
Bellevue, Washington 98077

4255641000**Parameters**

Regions

Code	Description
53011	Clark County, WA

53015	Cowlitz County, WA
53041	Lewis County, WA
53059	Skamania County, WA
53069	Wahkiakum County, WA

Job Titles

Code	Job Title
Computer and Mathematical	Cyber Analysts
Computer and Mathematical	Cyber Security Engineers
Computer and Mathematical	Cyber Security Analysts
Computer and Mathematical	Security Administrators
Computer and Mathematical	Security Architects
Computer and Mathematical	Information Security Specialists
Computer and Mathematical	Security Software Developers
Computer and Mathematical	Security Leads
Computer and Mathematical	Security Engineers
Computer and Mathematical	Security Researchers
Computer and Mathematical	Forensics Engineers
Computer and Mathematical	Information Assurance Analysts
Computer and Mathematical	Information Assurance Engineers
Computer and Mathematical	Information Security Analysts
Computer and Mathematical	Information Security Architects

Minimum Experience Required

Any

Education Levels

Any

Keyword Search

Timeframe

Sep 2016 - Oct 2017

Job Postings Summary

141	4 : 1	17 days
Unique Postings	**Posting Intensity**	**Median Posting Duration**
540 Total Postings	Regional Average: 3 : 1	Regional Average: 26 days

There were **540** total job postings for your selection from September 2016 to October 2017, of which **141** were unique**.** These numbers give us a Posting Intensity of **4-to-1**, meaning that for every 4 postings there is 1 unique job posting**.**This is close to the Posting Intensity for all other occupations and companies in the region (3-to-1), indicating that they are putting average effort toward hiring for this position.

Job Postings Regional Breakdown

County	Unique Postings (Sep 2016 - Oct 2017)
Clark County, WA	117
Cowlitz County, WA	10
Skamania County, WA	7
Lewis County, WA	5
Wahkiakum County, WA	2

Top 5 Most Recent Job Postings

Information Security Analyst — Vancity in Vancouver, WA (Oct 2017 - Dec 2017)

Analyst Information Security
Link to Live Job Posting: Posting is no longer active

Location: Vancouver, WA
O*NET: 15-1122.00
Company: Vancity
Job Title: Information Security Analyst
Are you interested in being a part of something greater? We are looking for people reflective of our members, who not only seek great career potential in a savvy organization, but also the opportunity to have an impact in their community. Vancity is changing the banking game. We are seeking people who have the knowledge, skills and abilities to deliver excellence in their work and to see beyond constraints. We offer competitive pay and an inclusive work place that promotes career development. At Vancity, you get more than just a job, you get a career with purpose. Job Details Requisition Number 17-0900 Post Date 10/27/2017 Close Date 11/5/2017 Title Analyst Information Security Employee Type Contract Employee Schedule Full-Time Job Category Risk Management City Vancouver Province BC Description Information Security Analyst1 Year Assignment With exceptional listening and compassion skills, and the ability to translate Vancity's Good Moneyâ¢ brand promise to our members, an Information Security Anaylst demonstrates solid communication skills and acts as a resource for this specialized area by providing advice, responding to enquiries and developing management reports. The Info Security Analyst reports directly into the Manager IT Risk. Key areas of accountability for this role are: Coordinate security incident response and resolution in order to avoid or minimize employee and/or member impact. Coordinate and assess defined IT procedures, networks and systems regularly to identify potential security risks and recommend remediation to the appropriate IT team. Recommend security policy and procedure changes to Manager in order to improve overall security. Monitor security risks and incidents and provide reports to Manager for tracking purposes. Here at Vancity, we have a consistent set of expectations for all employees: Work effectively and with full commitment on the tasks assigned by your manager. Give your manager your best advice. Stay within policy. Manage your ongoing career development at Vancity. Qualifications Competencies: SolidBusiness acumen in the context of the financial industry. SolidCommunication and interpersonal skills to act as a resource for the specialized area, providing specialized advice and explanations, and responding to enquiries; and also to develop management reports. SolidPlanning and coordination skills to plan optimum approach to address analytical, reporting and related business requirements. AdvancedResearch and analytical skills to perform qualitative/quantitative analysis, applying accepted methods, techniques to carry out analytical procedures. SolidKnowledge of Vancity strategies, functions and programs. Education: Degree in computer sciences, programming or related degree Certification in some of the following; Ethical hacking Cloud Security Application Security Testing Penetration testing Intrusion detection Incident response Computer forensics Reverse engineering Experience: Monitoring and modifying modern SIEMs Cloud security Application Security Testing Secure code development Penetration Testing Security operation and administration Incident response and recovery Networks and communication Malware analysis Modern endpoint protection Vulnerability Assessments

Security Engineer — Amazon.com, Inc. in Vancouver, WA (Oct 2017 - Nov 2017)

Security Engineer III
Link to Live Job Posting: Posting is no longer active
Location: Vancouver, WA
O*NET: 15-1122.00
Company: Amazon.com, Inc.
Job Title: Security Engineer
Security Engineer III [INS: :INS] Show me jobs like this one Employer: Amazon Industry: Internet / E-Commerce Retail / Merchandising Country: United States State/Province: Any City: All Cities Post Date: 10/22/2017 08:29 PM Job Location: 510 West Georgia Street, Vancouver, BC, V6B 0M3 We are looking for a Security Engineer, specializing in hardware and supply-chain security, to help ensure infrastructure supporting our highly scaled-out services is designed and implemented to the highest security standards. You will be responsible for analyzing low-level platform software such as kernel and hypervisor, firmware, and hardware designs for security issues and addressing them. This position will provide you with a challenging opportunity to drive the security of the cutting-edge technology underlying the AWS cloud computing services. A Security Engineer at Amazon is expected to be strong in multiple domains and provide significant contributions to the AWS IT Security team and

to multiple groups throughout Amazon. Security engineers are expected to develop elegant solutions to complex business problems and apply appropriate technologies while following security engineering best practices. You are also expected to mentor more junior engineers and be a security thought leader for the organization. A Security Engineer must foster constructive dialogue and seek resolution when confronted with discordant views. Engineers in this role are expected to participate fully in the planning of the AWS IT Security team's work and constantly seek opportunities for process improvement. They should also have a deep understanding of at least one specialty for which they are a sought out resource (both within AWS IT Security and by groups throughout Amazon), while having an understanding of the application of Information Security in a broad range of technical areas. A successful candidate will need a combination of troubleshooting, technical, and communication skills, as well as the ability to handle a mix of disparate tasks which may include project and software development work. This role will provide career growth opportunities as you gain new security skills in the course of your duties. Terms of Employment: Full time, permanent position Benefits: Amazon provides a full range of benefits for our global employees and their eligible family members. Eligible employees may also receive Amazon Restricted Stock Units. While they might vary from location to location, Amazon benefits for Canada may include: Health Care Savings Plans Income Protection Paid Time Off Signing Bonuses Employee Stock Salary Range: $121,700 to $203,200/yr, commensurate with experience Responsibilities: Hardware security reviews Design of secure infrastructure components Manual and automated security testing Projects and research work as needed Security training and outreach to internal teams Security guidance documentation Security automation tool development Basic Qualifications BS in Computer Science or related field, or equivalent work experience Minimum of 5 years of experience with any combination of the following: low-level programing in C and assembly, Linux kernel programming, virtualization security, x86 and/or ARM architectures familiarity, good understanding of firmware such as UEFI BIOS. Intermediate knowledge and understanding of security engineering, system and network security, security protocols, or cryptography Preferred Qualifications All applicants must meet the qualifications above

Cyber Security Engineer — Battelle Pacific Northwest National Laboratory in North Bonneville, WA (Oct 2017 - Dec 2017)

DoD Team Cyber Security Engineer, Associate

Link to Live Job Posting: Posting is no longer active

Location: North Bonneville, WA

O*NET: 15-1122.00

Company: Battelle Pacific Northwest National Laboratory

Job Title: Cyber Security Engineer

DoD Team Cyber Security Engineer, Associate Pacific Northwest National Laboratory North Bonneville, WA Organization and Job ID•Job ID: 306890 Directorate: National Security Division: Computing and Analytics Group: Cyber Security Job DescriptionIf you want to join a team of experts supporting DoD missions and enterprise operational systems, and if you want to develop, test, and implement enterprise level cyber security solutions, as well as participate in the development and testing of solutions deployed to the cloud and supporting the space enterprise, the DoD Team Cyber Security Engineer position could be for you As the DoD Team Cyber Security Engineer, you would participate on a team to develop the creation, demonstration, evaluation, and implementation of concepts and enterprise level processes for operational mission systems, including but not limited to: systems engineering and systems security engineering program protection planning ie, criticality analyzes, antitamper requirements development, cyber risk and resiliency assessments, military utility assessments, cyber test and evaluation, supply chain risk management, cyber defense and risk mitigations, analysis of alternatives Here?s what we?re looking for in our DoD Team Cyber Security Engineer: Credentials in computer science and embedded systems Passion for software engineering and the development of novel solutions Ability to work in a challenging and fastpaced environment Ability to communicate effectively at a technical level with peers and supervisors Ability to communicate at a nontechnical level to sponsors and management Experience researching vulnerabilities of COTS applications/systems Experience deploying technologies in milCloud, AWS Commercial, and/or AWS GovCloud Demonstrated experience with the full software development lifecycle Demonstrated experience testing hardware components Operating on the datainformationknowledge continuum, staff at PNNL employ diverse methods to confront significant problems of national interest?from distilling distributed data into knowledge that supports decision processes, to enabling resilient technologies that enhance computing at extreme scales, to equipping cyber defenders with tools that

prevent damaging cyberattacks Our research portfolio?spanning from basic to applied?includes data and computational engineering, highperformance computing, applied mathematics, semantic and human language technologies, machine learning, data and computing architectures, systems integration, and software and application development Computing researchers and practitioners work side by side to apply advanced theories, methods, algorithms, models, evaluation tools and testbeds, and computationalbased solutions address complex scientific challenges affecting energy, biological sciences, the environment, and national security Minimum QualificationsThis position is located offsite at the sponsor?s location in Los Angeles, California Applicants are expected to be willing to work at a sponsor location for a minimum of one year and relocate to the Richland, Washington upon completion of the assignment Bachelor?s degree in Computer Science, Mathematics, Engineering, Software Development, or related field; and at least 01 years? experience Preferred QualificationsIn addition to those skills listed above: An active TS/SCI clearance Familiarity with a variety of computing software including, but not limited to, Splunk, ELK, Visual Studio, MS Office, Matlab, etc Familiarity with equipment such as network analyzers, power supplies, oscilloscopes, etc Fluency in multiple programming languages such as C, C, Java, HTML, XML, JavaScript, PHP, SQL, LabView, VHDL, Python, C, and Terraform Equal Employment OpportunityPNNL is an Equal Opportunity/Affirmative Action Employer that is committed to hiring a diverse, talented workforce EOE Disability/Vet/M/F/Sexual Orientation/Gender Identity Staff at PNNL must be able to demonstrate the legal right to work in the United States Other InformationThis position requires the ability to obtain and maintain a federal security clearance Requirements: US Citizenship Investigation: Applicants selected will be subject to a Federal background investigation and must meet eligibility requirements for access to classified matter in accordance 10 CFR 710, Appendix B Testing: All Security Clearance L or Q positions will be considered by the Department of Energy to be Testing Designated Positions which means that they are subject to applicant, random, and for cause drug testing In addition, applicants must be able to demonstrate nonuse of illegal drugs, including marijuana, for the 12 consecutive months preceding completion of the requisite Questionnaire for National Security Positions QNSP Note: Applicants will be considered ineligible for security clearance processing by the US Department of Energy until nonuse of illegal drugs, including marijuana, for 12 consecutive months can be demonstrated Directorate:National Security DirJob Category:Computation and Information SciencesGroup:Cyber SecurityOpening Date:2017-09-25Closing Date: 2017-10-27•

Information Security Specialist — I & E Solutions Inc in Vancouver, WA (Oct 2017 - Oct 2017)

Specialist V Administrator 2Location

Link to Live Job Posting: Posting is no longer active

Location: Vancouver, WA

O*NET: 13-1023.00

Company: I & E Solutions Inc

Job Title: Information Security Specialist

Company name IeSolutions Location Vancouver, WA Add Notes and save to manually apply Add to My Hotlist Apply for this job your email: upload resume: 3 hit(s) Profile Job #: 8187Title: Contract Acquisition Specialist Administrator 2Location: VancouverApplication Due Date: 10122017Additional Position Information:ieSolutions is an Equal Opportunity Employer (EOE). MFDV. Security Clearance Requirement: Applicants selected will be subject to a government security investigation and must meet eligibility requirements for access to classified information. US Citizenship REQUIREDPosition Overview:This full-time Contract Acquisition Specialist 2 (COA2) contract position will provide support to the our client's Contracts & Strategic Sourcing (NSS) organization and report to NSSVConstruction Acquisition Team manager. This position will provide day-to-day support to Contracting Officers (COs) with, draft and preparation of solicitations, contracts and master contract releases and associated documentation; market research; interfaces with internal clients on statement of work and project timelines, and communications with external vendors on questions related to contracts and our client's established procurement process. This position is located in Vancouver, Washington.Position Responsibilities include:Note: all documents, drafts, materials andor recommendations, as listed below, must be reviewed, finalized and approved accepted by appropriate manager andor other federal personnel with the authority to do so. Gather, review, draft andor edit contract documents, including the process of award decisions per established procedure and as directed by CO Gather, review and organize vendor, contracting and project team data to provide information to contract team Coordinate projectprogram delivery schedules and questions with

the Team and Project Managers. Identify and communicate to contracting officers, andor project team members, internal and external roadblocks which may impact schedules and escalate to team manager Escalate vendor and team issues to respective contracting officer(s). May act as communications facilitator for project team and vendor(s) Research legal, contract information, company information, etc. Draft communication letters (e.g. correspondence to vendors, internal email etc.) Provide assistance on drafting solicitation documentation for review and approval by CO Issue solicitation packages as directed by CO Assist in developing master Company info IeSolutions Website : http://www.ie4solutions.com Company Profile Keep Information Solutions SimpleLower Cost of Ownership Through Simplicity Plant The Seeds for innovationEnvision Opportunities to Improve Performance Leave A Footprint BehindOur Work Lives On Well After It's Completion

Information Security Analyst — Teksystems, Inc. in Vancouver, WA (Sep 2017 - Sep 2017)

Security Analyst

Link to Live Job Posting: Posting is no longer active

Location: Vancouver, WA

O*NET: 15-1122.00

Company: Teksystems, Inc.

Job Title: Information Security Analyst

Security Analyst TEKsystems, Inc Posted: 09/16/2017 Apply Job Snapshot Location: Vancouver, WA, US Employee Type: Contractor Posting ID: 6115658 Job Summary General Position Overview: This position will work closely with Client's Cyber Security organization evaluating the existence and adequacy of current IT security controls, as well as develop documentation of testing and evaluation activity in order to arrive at logical and comprehensive conclusions and recommendations. The position will be expected to successfully document the resulting findings, weaknesses and vulnerabilities in a manner sufficient for a third-party reviewer to arrive at the conclusion the Security Analyst has reached in the work. Requirements: This is a Level 2 position: 5 - 9+ years of experience is required. (9+ years of experience is required without a Bachelor's degree) Experience evaluating the adequacy and existence of IT security controls. Having properly documented evidence of testing and evaluation activities sufficient for a third-party reviewer to arrive at the conclusion the Security Analyst has reached in the work. CISSP, CISA, CISM, CCNA certifications (all/one/some) preferred. 1 + years Experience performing security control testing and/or vulnerability assessments is highly preferred. 2 + years Experience with North American Electric Reliability Corporation, Critical Infrastructure Protection (NERC CIP) regulatory standards and requirements is highly preferred. 2+ years Experience with the Risk Management Framework and the 800 series of National Institute of Standards & Technology (NIST) is highly preferred. Preferred: Knowledge of networking and internetworking (e.g. routing, switching etc.), computer and network device operating systems (e.g. Windows, Unix, Linux, IOS etc.), firewalls, and general security engineering concepts. Preferred: Knowledge of intrusion detection and/or intrusion prevention system (IDS/IPS) technologies and deployment strategies. Our customer cannot support Foreign National Clients. NO SUB-VENDORS PLEASE. About TEKsystems: Join TEKsystems®, a leading IT staffing, IT talent management and IT services firm, and get your career on the fast track. We have more than 100 offices worldwide, and we partner with over 6,000 clients and place over 80,000 consultants per year. At TEKsystems, we seek to understand our consultants' skills, goals and interests, allowing us to present targeted job opportunities on a contract, contract-to-hire or direct placement basis. TEKsystems' leadership in the market stems from our sincere and personal commitment to driving the success of our customers, consultants and each other. The company is an equal opportunity employer and will consider all applications without regards to race, sex, age, color, religion, national origin, veteran status, disability, sexual orientation, gender identity, genetic information or any characteristic protected by law. If you would like to request a reasonable accommodation, such as the modification or adjustment of the job application process or interviewing process due to a disability, please call 888 472-3411 or email accommodation@teksystems.com for other accommodation options. Contact Information Name: Eleanor O'Brien Email: elobrien@teksystems.com Phone: 5032053448

Monthly Active Postings

Top Companies Posting

Company	Total/Unique (Sep 2016 - Oct 2017)	Posting Intensity	Median Posting Duration
Canerday Trucking Recruiting Service	42 / 29	1 : 1	2 days
Glassdoor, Inc.	21 / 15	1 : 1	11 days
Hewlett-Packard Company	87 / 12	7 : 1	58 days
Peacehealth	27 / 5	5 : 1	60 days
TELUS Corporation	9 / 5	2 : 1	32 days
Battelle Pacific Northwest National Laboratory	7 / 4	2 : 1	16 days
Ca, Inc.	7 / 4	2 : 1	24 days
Navigant Consulting, Inc.	4 / 4	1 : 1	56 days
Vanderhouwen & Associates, Inc.	74 / 4	19 : 1	34 days
Amazon.com, Inc.	3 / 3	1 : 1	3 days
Emergitel Inc	3 / 3	1 : 1	16 days
Vancity	5 / 3	2 : 1	16 days
Cybercoders, Inc.	42 / 2	21 : 1	15 days
Evo Solutions, Llc.	18 / 2	9 : 1	66 days
FORGEROCK LIMITED	10 / 2	5 : 1	53 days
Procom	3 / 2	2 : 1	48 days
Staffing Inc Corporate	2 / 2	1 : 1	30 days
Tech Talent Inc	40 / 2	20 : 1	30 days
Teksystems, Inc.	13 / 2	7 : 1	12 days
Affinity	1 / 1	1 : 1	3 days
Analysts International Corporation	5 / 1	5 : 1	n/a
Applicance Pro, LLC	7 / 1	7 : 1	15 days
Azad Inc	1 / 1	1 : 1	14 days
Columbia Community Credit Union	17 / 1	17 : 1	108 days
Earthlink Holdings Corp.	4 / 1	4 : 1	23 days

Energy	1 / 1	1 : 1	14 days
Flexjobs Corp	2 / 1	2 : 1	9 days
Greater Vancouver Regional District	1 / 1	1 : 1	15 days
Honeywell International Inc.	1 / 1	1 : 1	17 days
I & E Solutions Inc	2 / 1	2 : 1	8 days
Industrial Cyber Security, LLC	2 / 1	2 : 1	32 days
It Motives LLC	1 / 1	1 : 1	241 days
Kelly Services, Inc.	13 / 1	13 : 1	50 days
Kforce Inc.	20 / 1	20 : 1	125 days
L&I Inc	1 / 1	1 : 1	32 days
Medtronic, Inc.	1 / 1	1 : 1	6 days
Mindpoint Group, LLC	1 / 1	1 : 1	6 days
Ministry Of Justice	1 / 1	1 : 1	10 days
Modis, Inc.	1 / 1	1 : 1	26 days
Nautilus, Inc.	7 / 1	7 : 1	150 days
Netflix, Inc.	1 / 1	1 : 1	168 days
O2E Brands Inc	1 / 1	1 : 1	38 days
Professional Quality Assurance Ltd	2 / 1	2 : 1	61 days
Robert Half International Inc.	6 / 1	6 : 1	51 days
STA Inc	1 / 1	1 : 1	4 days
Salient Corporation	4 / 1	4 : 1	10 days
Seh America, Inc.	2 / 1	2 : 1	47 days
Staffing Solutions Inc	1 / 1	1 : 1	2 days
The Innovation Group Inc	3 / 1	3 : 1	30 days

Top Cities Posting

City	Total/Unique (Sep 2016 - Oct 2017)	Posting Intensity	Median Posting Duration
Vancouver, WA	496 / 104	5 : 1	28 days
North Bonneville, WA	8 / 5	2 : 1	16 days

Camas, WA	7 / 3	2 : 1	4 days
Ireland, WA	2 / 2	1 : 1	6 days
Longview, WA	2 / 2	1 : 1	2 days
Amboy, WA	1 / 1	1 : 1	2 days
Ariel, WA	1 / 1	1 : 1	2 days
Battle Ground, WA	1 / 1	1 : 1	2 days
Brush Prairie, WA	1 / 1	1 : 1	2 days
Carrolls, WA	1 / 1	1 : 1	17 days
Carson, WA	1 / 1	1 : 1	2 days
Castle Rock, WA	1 / 1	1 : 1	17 days
Cathlamet, WA	1 / 1	1 : 1	17 days
Cougar, WA	1 / 1	1 : 1	2 days
Heisson, WA	1 / 1	1 : 1	2 days
Kelso, WA	1 / 1	1 : 1	2 days
La Center, WA	1 / 1	1 : 1	2 days
Mossyrock, WA	1 / 1	1 : 1	2 days
Ridgefield, WA	1 / 1	1 : 1	2 days
Ryderwood, WA	1 / 1	1 : 1	2 days
Salkum, WA	1 / 1	1 : 1	2 days
Skamokawa, WA	1 / 1	1 : 1	2 days
Toledo, WA	1 / 1	1 : 1	2 days
Toutle, WA	1 / 1	1 : 1	2 days
Underwood, WA	1 / 1	1 : 1	2 days
Vader, WA	1 / 1	1 : 1	2 days
Washougal, WA	1 / 1	1 : 1	3 days
Winlock, WA	1 / 1	1 : 1	2 days
Woodland, WA	1 / 1	1 : 1	3 days
Yacolt, WA	1 / 1	1 : 1	17 days

Top Posted Occupations

Occupation (SOC)	Total/Unique (Sep 2016 - Oct 2017)	Posting Intensity	Median Posting Duration
Information Security Analysts	310 / 80	4 : 1	24 days
Software Developers, Applications	122 / 16	8 : 1	67 days
Computer Occupations, All Other	5 / 4	1 : 1	31 days
Web Developers	42 / 2	21 : 1	15 days
Security Guards	3 / 2	2 : 1	2 days

Marketing Managers	2 / 1	2 : 1	13 days
Computer and Information Systems Managers	1 / 1	1 : 1	13 days
Emergency Management Directors	1 / 1	1 : 1	6 days
Buyers and Purchasing Agents	2 / 1	2 : 1	8 days
Network and Computer Systems Administrators	1 / 1	1 : 1	10 days
Computer User Support Specialists	7 / 1	7 : 1	39 days
Environmental Engineers	1 / 1	1 : 1	15 days
Childcare Workers	1 / 1	1 : 1	20 days

Top Posted Job Titles

Job Title	Total/Unique (Sep 2016 - Oct 2017)	Posting Intensity	Median Posting Duration
Security Engineer	264 / 68	4 : 1	14 days
Information Security Analyst	146 / 26	6 : 1	22 days
Cyber Security Engineer	29 / 16	2 : 1	16 days
Information Security Specialist	74 / 15	5 : 1	22 days
Security Architect	8 / 5	2 : 1	24 days
Security Administrator	4 / 4	1 : 1	2 days
Information Security Architect	3 / 2	2 : 1	3 days
Security Researcher	9 / 2	5 : 1	35 days
Cyber Security Analyst	1 / 1	1 : 1	28 days
Information Assurance Analyst	1 / 1	1 : 1	2 days
Security Software Developer	1 / 1	1 : 1	20 days

The following provides insight into the supply and demand of relevant skills by comparing the frequency of skills present in job postings against skills present in today's workforce. Along with Emsi's job posting analytics, this comparison leverages Emsi's dataset of more than 100M online resumés and profiles. All resumés and profiles used in these comparisons have been updated within the last three years.*The skills associated with workforce profiles represent workers of all education and experience levels.

Top Hard Skills

Top Hard Skills

Skill	Frequency in Postings	Postings with Skill / Total Postings (Sep 2016 - Oct 2017)	Frequency in Profiles	Profiles with Skill / Total Profiles (2016 - 2018)
Vulnerability	26%	37 / 141	8%	4 / 50
Cyber Security	21%	30 / 141	12%	6 / 50
Application Security	19%	27 / 141	6%	3 / 50
Penetration Testing	18%	26 / 141	8%	4 / 50
Incident Response	15%	21 / 141	8%	4 / 50
Python (Programming Language)	14%	20 / 141	2%	1 / 50
Amazon Web Services	13%	19 / 141	2%	1 / 50
Open Web Application Security	13%	19 / 141	0%	0 / 50
Ruby On Rails	13%	19 / 141	2%	1 / 50
Security Policies	13%	19 / 141	10%	5 / 50
C (Programming Language)	13%	18 / 141	4%	2 / 50
Java (Programming Language)	13%	18 / 141	8%	4 / 50
Information Systems	11%	16 / 141	4%	2 / 50
Security Engineering	11%	16 / 141	0%	0 / 50
Encryption	10%	14 / 141	2%	1 / 50
Reverse Engineering	10%	14 / 141	0%	0 / 50
Risk Analysis	10%	14 / 141	12%	6 / 50
Risk Management	10%	14 / 141	6%	3 / 50
Security Information And Event Management	10%	14 / 141	8%	4 / 50
Software Development	10%	14 / 141	2%	1 / 50
Intrusion Detection And Prevention	9%	13 / 141	6%	3 / 50
Microsoft Access	9%	13 / 141	18%	9 / 50
Auditing	8%	11 / 141	12%	6 / 50
In-Plane Switching (IPS)	8%	11 / 141	2%	1 / 50

Network Security	8%	11 / 141	26%	13 / 50
Automation	7%	10 / 141	4%	2 / 50
Linux	7%	10 / 141	6%	3 / 50
Access Controls	6%	9 / 141	6%	3 / 50
Information Leak Prevention	6%	9 / 141	2%	1 / 50
Security Controls	6%	9 / 141	0%	0 / 50
Unix	6%	9 / 141	4%	2 / 50
C++ (Programming Language)	6%	8 / 141	4%	2 / 50
Disaster Recovery	6%	8 / 141	18%	9 / 50
Operating Systems	6%	8 / 141	16%	8 / 50
Scripting	6%	8 / 141	0%	0 / 50
Seim (Language)	6%	8 / 141	0%	0 / 50
Software Development Life Cycle	6%	8 / 141	0%	0 / 50
Software Engineering	6%	8 / 141	0%	0 / 50
Telecommunications	6%	8 / 141	8%	4 / 50
Customer Identification Program	5%	7 / 141	2%	1 / 50
Identity Management	5%	7 / 141	2%	1 / 50
Mitigation	5%	7 / 141	4%	2 / 50
Systems Development Life Cycle	5%	7 / 141	0%	0 / 50
Vulnerability Management	5%	7 / 141	4%	2 / 50
Web Application Security	5%	7 / 141	0%	0 / 50
Authentications	4%	6 / 141	4%	2 / 50
Business Process Improvement	4%	6 / 141	6%	3 / 50
Computer Engineering	4%	6 / 141	0%	0 / 50
Cryptography	4%	6 / 141	0%	0 / 50
Enhanced Data Rates For GSM Evolution	4%	6 / 141	0%	0 / 50

Top Common Skills

Top Common Skills

Skill	Frequency in Postings	Postings with Skill / Total Postings (Sep 2016 - Oct 2017)	Frequency in Profiles	Profiles with Skill / Total Profiles (2016 - 2018)
Management	42%	59 / 141	20%	10 / 50

Infrastructure	21%	30 / 141	14%	7 / 50
Communications	20%	28 / 141	2%	1 / 50
Information Technology	19%	27 / 141	22%	11 / 50
Operations	18%	25 / 141	26%	13 / 50
Research	17%	24 / 141	8%	4 / 50
Innovation	13%	19 / 141	0%	0 / 50
Leadership	13%	19 / 141	14%	7 / 50
Computer Sciences	12%	17 / 141	0%	0 / 50
Microsoft Windows	11%	16 / 141	16%	8 / 50
Problem Solving	11%	16 / 141	4%	2 / 50
Integration	9%	12 / 141	8%	4 / 50
Governance	7%	10 / 141	0%	0 / 50
Presentations	6%	9 / 141	4%	2 / 50
Project Management	6%	9 / 141	10%	5 / 50
Interpersonal Skills	6%	8 / 141	0%	0 / 50
Application Development	5%	7 / 141	0%	0 / 50
Microsoft Antivirus	5%	7 / 141	10%	5 / 50
Written Communication	5%	7 / 141	0%	0 / 50
Coordinating	4%	6 / 141	2%	1 / 50
Time Management	4%	6 / 141	0%	0 / 50
Troubleshooting (Problem Solving)	4%	6 / 141	18%	9 / 50
Business Acumen	4%	5 / 141	0%	0 / 50
Investigation	4%	5 / 141	10%	5 / 50
Microsoft Excel	4%	5 / 141	6%	3 / 50
Microsoft Outlook	4%	5 / 141	0%	0 / 50
Trust	4%	5 / 141	0%	0 / 50
Verbal Communication Skills	4%	5 / 141	0%	0 / 50
Customer Service	3%	4 / 141	8%	4 / 50
Financial Services	3%	4 / 141	0%	0 / 50
Mathematics	3%	4 / 141	0%	0 / 50
Mentorship	3%	4 / 141	4%	2 / 50
Sales	3%	4 / 141	8%	4 / 50
Creativity	2%	3 / 141	0%	0 / 50
Negotiation	2%	3 / 141	0%	0 / 50
Organizational Awareness	2%	3 / 141	0%	0 / 50
Prioritization	2%	3 / 141	0%	0 / 50
Program Management	2%	3 / 141	8%	4 / 50
Proposal (Business)	2%	3 / 141	0%	0 / 50
Apple IOS	1%	2 / 141	0%	0 / 50
English Language	1%	2 / 141	0%	0 / 50

Intellectual	1%	2 / 141	0%	0 / 50
Lifelong Learning	1%	2 / 141	0%	0 / 50
Multilingualism	1%	2 / 141	0%	0 / 50
Strategic Thinking	1%	2 / 141	0%	0 / 50
Wireless Communications	1%	2 / 141	4%	2 / 50
Android (Operating System)	1%	1 / 141	2%	1 / 50
Cardiopulmonary Resuscitation	1%	1 / 141	0%	0 / 50
Challenge Driven	1%	1 / 141	0%	0 / 50
Cleanliness	1%	1 / 141	0%	0 / 50

Top Qualifications

Qualification	Postings with Qualification
Certified Information Systems Security Professional	23
Certified Information Security Manager	17
Cisco Certified Network Associate	6
Cisco Certified Network Professional	5
Certified In Risk And Information Systems Control	4
GIAC Security Essentials Certification	4
Global Information Assurance Certification	3
Microsoft Certified Professional	2
Microsoft Certified Systems Engineer	2
Cisco Certified Network Associate Security (CCNA Security)	1
CompTIA Security+	1
Forensic Examiner Certification	1
GIAC Certified Incident Handler	1
Information Systems Security Architecture Professional	1
Offensive Security Certified Professional	1
Systems Security Certified Practitioner	1

Appendix A - Data Sources and Calculations

Emsi Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

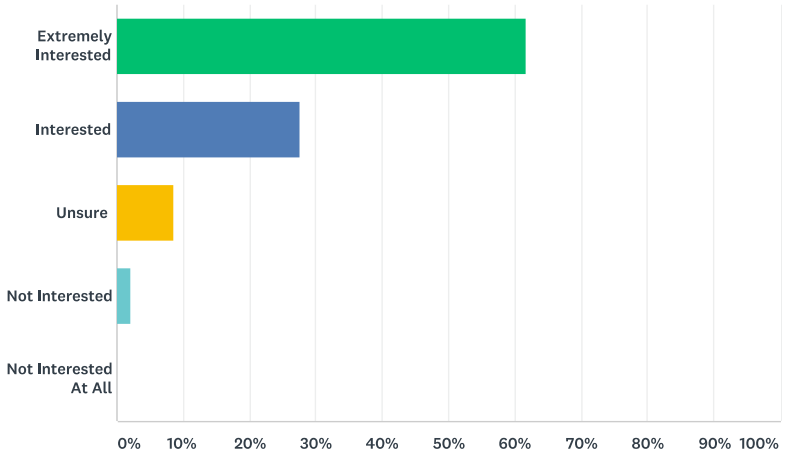
State Data Sources

This report uses state data from the following agencies: Washington State Employment Security Department, Labor Market and Economic Analysis Branch

Clark College Baccalaureate of Applied Sciences Degree in Cyber Security Alumni & Current Students Survey

Q1 If a Bachelor of Applied Science (BAS) degree in Cyber Security was offered at Clark College, how likely would you be to enroll?

Answered: 47 Skipped: 0

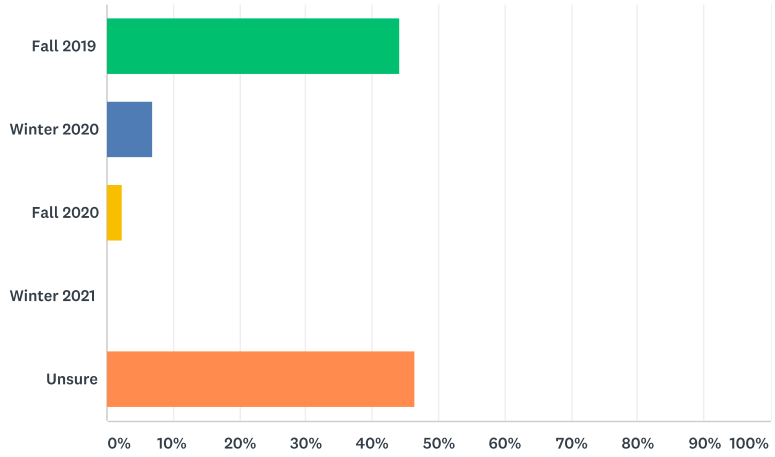


ANSWER CHOICES	RESPONSES	
Extremely Interested	61.70%	29
Interested	27.66%	13
Unsure	8.51%	4
Not Interested	2.13%	1
Not Interested At All	0.00%	0
TOTAL		47

Clark College Baccalaureate of Applied Sciences Degree in Cyber Security Alumni & Current Students Survey

Q2 When would you most likely enroll?

Answered: 43 Skipped: 4

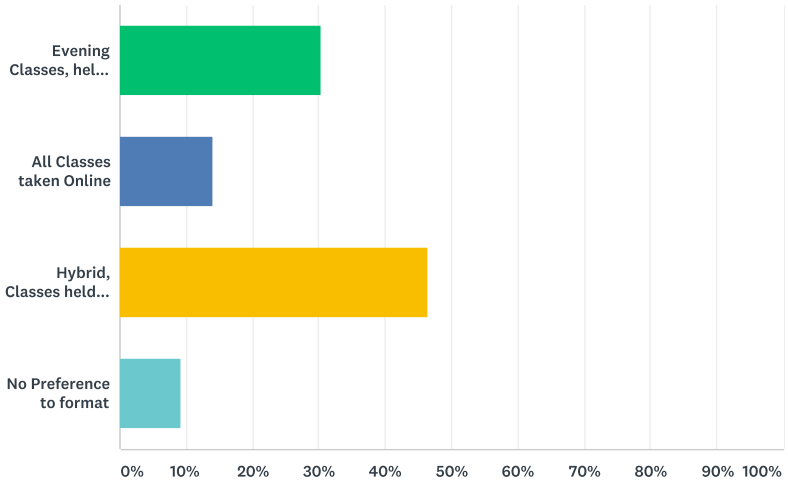


ANSWER CHOICES	RESPONSES	
Fall 2019	44.19%	19
Winter 2020	6.98%	3
Fall 2020	2.33%	1
Winter 2021	0.00%	0
Unsure	46.51%	20
TOTAL		43

Clark College Baccalaureate of Applied Sciences Degree in Cyber Security Alumni & Current Students Survey

Q3 If you were to enroll in the Cyber Security BAS Degree at Clark College, what format would you chose to have these classes held in?

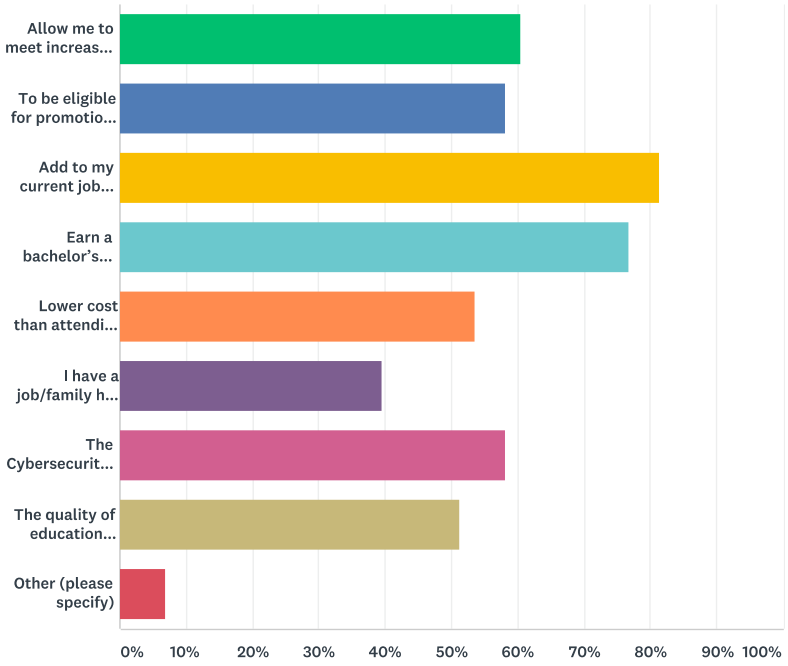
Answered: 43 Skipped: 4



ANSWER CHOICES	RESPONSES	
Evening Classes, held on Campus	30.23%	13
All Classes taken Online	13.95%	6
Hybrid, Classes held on Campus and taken Online	46.51%	20
No Preference to format	9.30%	4
TOTAL		43

Q4 Please identify the reasons you would pursue a Cyber Security BAS Degree at Clark College: [Select all that apply]

Answered: 43 Skipped: 4



ANSWER CHOICES	RESPONSES	
Allow me to meet increasing education requirements for my job.	60.47%	26
To be eligible for promotion and advanced positions.	58.14%	25
Add to my current job skills.	81.40%	35
Earn a bachelor's degree.	76.74%	33
Lower cost than attending a 4-year university.	53.49%	23
I have a job/family here and would like to stay local to avoid additional travel expenses.	39.53%	17
The Cybersecurity Program content is focused on my career goals.	58.14%	25
The quality of education offered at Clark College.	51.16%	22
Other (please specify)	6.98%	3
Total Respondents: 43		

#	OTHER (PLEASE SPECIFY)	DATE
1	This sort of stuff interests me. I may take a class or two just to learn some stuff without pursuing a full degree.	5/24/2018 6:41 PM
2	Gain skills for future business opportunities	5/24/2018 4:23 PM
3	This program is a perfect fit for me. I am incredibly excited to see where it goes.	5/24/2018 9:45 AM

Clark College Baccalaureate of Applied Sciences Degree in Cyber Security Alumni & Current Students Survey

Q5 Please provide any questions or comments you have regarding a new Bachelor of Applied Science (BAS) degree in Cyber Security.

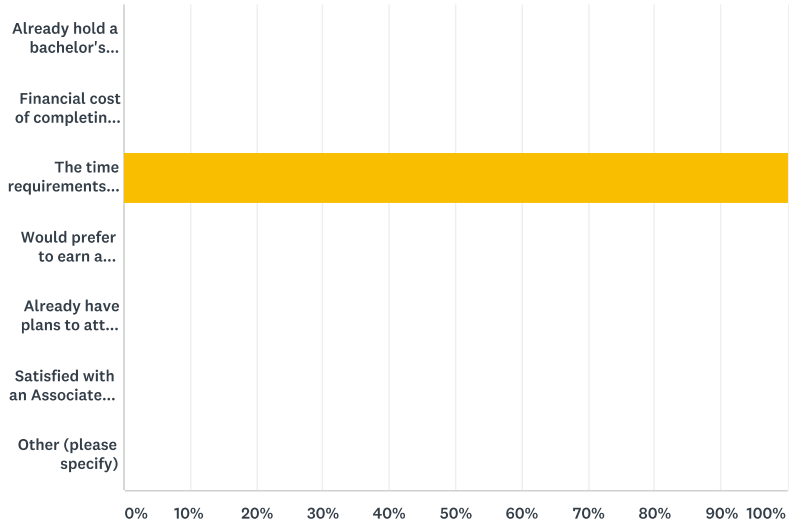
Answered: 13 Skipped: 34

#	RESPONSES	DATE
1	Cyber Security is actually the field I am interested in. I couldn't find a Cyber Security program in this area that qualifies for the schooling program I am currently in, so I chose to go into Computer Networking with the intention of later pursuing Cyber Security. Clark would definitely be my first choice for schooling.	5/28/2018 2:13 PM
2	I am currently an NTEC student(AAT Network Tech), which classes would transfer between the AAT and the BAS?	5/24/2018 7:40 PM
3	How closely is the material related to the Network Technologies degree, and what credits are transferable? What certifications does the course offer? (CEH, CISSP)	5/24/2018 4:23 PM
4	Main thing I would wonder would be feasibility of doing the BAS here instead of transferring to a 4 year university and getting it there instead. Like quality, how good a BAS would look from a community college as opposed to one from a university like WSU or something along those lines.	5/24/2018 11:31 AM
5	When would the program be available to pursue?	5/24/2018 10:56 AM
6	Their are two Questions; What Math do I need to enter Cyber Security. As well are their any other classes I need to take before I start the program a year from now. I do have a Cisco AA degree from Clark.	5/24/2018 9:58 AM
7	I really enjoy taking classes that prep me for industry certifications. Would there be more classes in this new program that would have that type of curriculum?	5/24/2018 9:48 AM
8	I believe it would be a great addition to the curriculum at Clark. Employers are requiring more than just Associates Degrees these days, so the program would be a breath of fresh air for those seeking to meet these requirements	5/24/2018 9:47 AM
9	Is there going to be a cyber response portion? I would like to see how a cyber response team acts on an incoming threat.	5/24/2018 9:45 AM
10	I have heard rumors about this degree being in the works for some time now and I am very happy to see it moving forward. Few colleges in the area offer courses in this field and having one nearby would be a great opportunity.	5/24/2018 9:45 AM
11	What is the soonest it will be It be implemented? I am in the network tech aat as wel well as using voc rehab and would like to roll right into it. Also, what classes should I take now that will be necessary for the program? Thanks.	5/24/2018 9:43 AM
12	Really excited to see this program go live!	5/24/2018 9:38 AM
13	Not exactly a question but I would also be interested in other Bachelor degrees in the networking and IT fields at Clark college as well.	5/24/2018 9:34 AM

Clark College Baccalaureate of Applied Sciences Degree in Cyber Security Alumni & Current Students Survey

Q7 If you are not interested in acquiring a BAS degree in Cybersecurity at Clark College, can you tell us the reason for not pursuing it? [Select all that apply]

Answered: 1 Skipped: 46



ANSWER CHOICES	RESPONSES	
Already hold a bachelor's degree.	0.00%	0
Financial cost of completing a bachelor's degree.	0.00%	0
The time requirements in completing a bachelor's degree.	100.00%	1
Would prefer to earn a bachelor's degree in another field.	0.00%	0
Already have plans to attend another college or university.	0.00%	0
Satisfied with an Associate's degree or certificate (no need to further my career path).	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 1		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Appendix E – Employer Panel Discussion about Cyber Security Occupations

MINUTES

PANEL: Cyber Security Experts Panel

DATE: November 15, 2017

TIME: 5:30-7:00 PM

PRESENTER: Dwight Hughes, Clark College.

PANELISTS: Tom Strobehn, Fastech Solutions; Dustin Nikora, Conmet; Ben Cecka, Clark College; Francois Caen, Cisco; Patterson Cake, PeaceHealth; George DeCarlo, Woobox.

	QUESTION	DISCUSSION
1.	Introduction	The purpose of this panel is to explore the potential of offering a cyber-security bachelor's degree at Clark College, building on the existing associate's degree.
2.	What are potential job titles that would include cyber-security roles as job responsibilities?	Tom: It is difficult to define specific job titles because all employees need to have an understanding of security. It is equally important for entry-level employees as it is for upper management. Most breaches occur at higher levels. Smaller companies do not necessarily have dedicated security staff, making each employee responsible for playing a role in security. Dustin: Security administrator. Ben: Network specialist, Windows specialist, information security officer. Everyone in the organization must be aware of and share responsibility for security. Everyone in IT has to have some knowledge of security. Francois: All employees must have knowledge of security. Patterson: Security engineer. George: Three primary roles are customer support, network access, and developers.

3.	Which cyber-related responsibilities, tasks, and skills would be required in these job titles or roles?	Tom: Monitoring log files and the ability to interpret these files, an understanding of phishing, the ability to interpret information from clients, and customer service. Students need to be strong in PowerShell. Dustin: Audits, firewall techs, and troubleshooting methodology. Problem-solving skills are essential-students can be trained in technical skills, but they must know how to and be comfortable with solving problems. Ben: Hard skills, such as automation scripting and filtering large amounts of data. Soft skills such as problem solving and customer service because the whole organization will benefit. Francois: Policy should include basic scripting skills. Students should take Python 101 or something similar. Security ops should include firewall and a strong foundation in networking. Patterson: Valuable skills include the ability to effectively prioritize, especially at entry-level. Basic functionality of operating systems, strong networking fundamentals, and scripting. There is a significant increase in attacks through PowerShell. George: A graduate should be able to do everything on the PCI checklist. They should have an understanding of how attacks work from the other side.
4.	Are there industry certifications that are essential to these job titles or roles?	Tom: Yes. At least a CompTIA. Dustin: SANS GSEC. However, due to the changing nature of the industry, essential certifications may change in the future. Ben: CompTIA, Certified Ethical Hacker (CEH), CISSP. Francois: Cisco. Patterson: CCNA, Security Plus, GIAC, CompTIA. George: Could a bachelor's degree include components of these certifications rather than having students graduate with specific certifications?
5.	Which prerequisite skills would a candidate need to possess for these job titles or roles?	Tom: PowerShell, mathematics, CCNA classes, security courses of increasing levels. Ben: CCNA, routing. Francois: Basics of scripting. The necessary skills will depend on the student. A young student may already be familiar with desktop and basic skills; an older worker trying to translate existing skills may not have as many computer skills. Patterson: OS, desktop, Windows 7, 10, Linux. Network Plus. Network services. Web technologies. OS/Windows—not only a familiarity with using these systems but perceiving active threats. It is necessary to have above basic user skills. George: Web app.
6.	What trends do you see that indicate the specific cyber-security skills that will be needed in the next five years?	Tom: Programming. Programs that will help entry-level security professionals do their job. Dustin: Programming. Vulnerabilities that need to be watched for and protected against. Francois: Automation. Things are changing—complexities and demand are increasing. Patterson: PowerShell, automation, cloud security.

		George: Fewer skills will be needed. Today, older software is being used that requires a lot of work on the part of the employee. In the future, newer software, such as artificial intelligence, will make the job easier by doing the work for them. However, it will continue to be critical to understand how the software works and how to use it.
7.	Will a 4-year bachelor's degree have the potential to provide enough skills acquisition for students to fill entry-level cyber-security jobs?	Current research shows that a two-year program is not enough to provide the depth of skills necessary. Tom: Yes, a four-year degree will provide students with the necessary skills for entry-level positions in cyber security. The only way to rise is through work experience and further education. Dustin: Yes, entry-level. Francois: Yes, today students can graduate with a CCNA certification, work for two years, acquire skills on the job, are paid, and then progress into security. Would a bachelor's offer the same, but with less income and less work experience? However, if students graduating with an associate's degree are not able to find work without a bachelor's degree, it sounds like offering the degree would meet the community's need. Question: What will the degree path look like? Answer: It will build on the existing two-year program. Students who already have an associate's degree could come back and take the remaining credits needed. Patterson: The current trend is to hire someone with a two-year degree in related studies, who possesses a solid understanding of the industry. They would definitely be considered for an entry-level position. However, many companies expect a candidate to possess a four-year degree. Many students desire a four-year degree in this field, but have not pursued it because it is not an option that is offered in the community. They can obtain a four-year degree in computer science or business management, but not in IT. They find that after graduating, they are hitting the glass ceiling if they do not possess a four-year degree. George: Cyber security needs will only increase. Yes. Question from the audience: Will there be an internship component? Answer: Yes, there is already an internship component in the existing program. Francois: Has seen personal benefits from participating in an internship program. An audience member commented that they have personally experienced difficulty finding employment without a bachelor's degree. They had to demonstrate the skills gained through internships and outside experience. Tom: Many government contracts require a technician with a four-year degree to be onsite.

8.	What challenges might students face as they graduate and begin searching for their first job?	Tom: A lack of experience and lack of customer service skills. Could the new program include mock interviews? Interviewing skills are very important. An interpersonal communication class should be mandatory in the program. George: Soft skills are essential. Dustin: More qualified candidates that did not possess the soft skills have been passed over in favor of less-qualified candidates who did. Francois: It will be important to emphasize professionalism. For example, a professional appearance is very important. Patterson: Students need to have a sense of responsibility towards the sensitivity and confidentiality of the data they will be handling. George: The program should incorporate problem-solving ability—not just reading books or completing assignments, but really developing skills to not only solve existing problems, but prevent future ones as well. CCNP is a certification that Clark should look at.
9.	Questions?	For the panel: Is there a trend besides cyber security or a subset of IT skills that should be focused on? Patterson: The only department that will be growing in the near future will be cyber security.

Cyber Bachelor of Applied Science (BAS) Experts Panel
Wednesday, November 15, 2017
5:30 – 7:00 pm in Building AA4, Room 203

Print Name	Company	Title/Role	Email Address	Signature
Dustin Nikora	Con Met	Sec of Compliance		
Ryan Fanning	UNS	Tech Services Manager	rfanning@uns.edu	
Ben Cecka	Clark College	Dir. IT Infrastructure & Security	bcecka@clark.edu	
Francois Wang	"	Dir Econ. Dev.		
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Appendix E – Employer Panel Discussion about Cyber Security Occupations

Cyber Bachelor of Applied Science (BAS) Experts Panel
Wednesday, November 15, 2017
5:30 – 7:00 pm in Building AA4, Room 203

Print Name	Company	Title/Role	Email Address	Signature
BEN LYONS	CLARK COLLEGE	STUDENT	B.LYONS2@STUDENTS.CLARK[illegible]	[illegible]
Robert Hyle	Clark College			
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PATTERSON CAKE	[illegible]	Panel	patterson.cake@gmail.com	[illegible]
Ian Boyd	Avamere	Observer	IBoyd@Avamere.com	[illegible]

Appendix F - Applied Baccalaureate Degree Supply/Demand Gap Rubric for Colleges

The goal of this rubric is to help you build a program that will meet the needs of your community. We have given you options about the information you can use to support the need for your new program. Also, the guidelines for estimating the supply/demand gap are similar to the ones we use for other program applications. We hope this makes the rubric more familiar to you. If not, contact Joyce Hammer at jhammer@sbctc.edu for further information.

The application needs to show the information below for program approval:

- employers demand* the level of technical training proposed within the program, making it cost-effective for students to seek the degree;
- lead to high wage-earning jobs; and
- the proposed program fills a gap in options available for students because it is not offered by a public four-year institution of higher education in the college's geographic area.

College Name: Clark College
Program Name: Cybersecurity
Select one: Existing Occupation ☐ **or** Emerging Occupation ☒
If local demand/supply information is available for the specified degree program and target occupation(s),**

For demand: Provide local/regional demand data for the targeted occupation job title(s) from traditional labor market data, industry data, trade association data, or other transactional data. (*Provide absolute numbers, not just percentages*)	Emsi occupational data for Southwest Washington for the Network and Computer System Administrators (SOC 15-1142) occupation shows there were 2,480 positions in our area for this occupation in 2017 and estimated to be 2,971 positions by 2027, an overall increase of 14%. Emsi job posting analytics for SW Washington from September 2016 to October 2017 showed 141 unique position openings related to cybersecurity within our region with the highest number (80 of the 141 position openings) for Information Security Analysts (SOC 15-122). The Washington State Employment Security Department reports that, in Washington state the three SOC codes related to this proposed BAS degree are listed as being in demand. And according to the Federal Bureau of Labor Statistics (BLS), "the typical level of education that most workers need to enter these three occupations is a baccalaureate degree along with additional training, experience, licenses or credentials." • Computer Systems Analyst positions (SOC Code: 15-1121) are expected to increase 16%, from 4653 in 2018 to 5,383 in 2028 (updated 9/11/2018). • Information System Analyst positions (SOC Code: 15-1122) are expected to increase 31%, from 848 in 2018 to 1109 in 2028 (updated 9/11/2018). • Network and Computer System Administrators (SOC Code: 15-1142) are expected to increase 14%, from 2,623 in 2018 to be 2,997 positions by 2028. See Appendix B for complete Emsi occupational data for SOC 15-1142 (updated 9/11/2018).

For supply gap: Provide data on the number of programs and the number of annual program graduates for all four-year colleges that supply your region. Is the number of current annual graduates insufficient to meet current and projected demand? (The result of demand minus supply).	Clark College would be the only baccalaureate level educational program with a focus on cybersecurity anywhere in Southwest Washington and also anywhere throughout the larger Portland OR/Vancouver WA areas. We anticipate graduating 20 students annually from this proposed BAS. Mt. Hood Community College in Gresham OR is the only other school offering a cybersecurity related degree. Their degree is at the associate level and we have had discussions with them for articulating their degree to our proposed BAS so their students have a pathway to a local baccalaureate level option. Other schools in our area offering IT related degrees include: • Charter College • Mt Hood Community College (associates IT related) • Portland Community College (associates IT related) • Portland State University (baccalaureate CS) • Pioneer Pacific College (associates IT related) • University of Phoenix-Oregon (associates IT related) • Washington State University-Vancouver (baccalaureate MIS, CS)
OR, if demand information is not available or it is a new/emerging/changing occupation, **	
For demand: Provide employer survey results for local demand for the targeted occupation job title(s) to support the demand and education level for the program. Survey requirements are listed below.	See Appendix A for complete employer survey results. 84% of survey respondents indicated that a bachelor's degree was a preference for cybersecurity positions within their organization (survey question eight). And with no available cybersecurity focused baccalaureate level degree in the area it is not surprising to see that 55% of respondents had difficulty finding baccalaureate level applicants for their open cybersecurity positions (survey question 9).

For supply gap: Provide employer survey results for local supply for the targeted occupation job title(s) to support that there is a gap in the number of qualified applicants available to fill jobs. Survey requirements are listed below.	The growing demand for cybersecurity professionals within our local area was demonstrated by the responses to survey question six, "How many cybersecurity positions, if any, do you anticipate having open in the next 3 years?" The response average showed a 200% growth from the number of cybersecurity related positions they have open today (survey question five). The average open positions currently per employer was 1, and 3.25 openings average at each employer within 3 years.
OR, if based on a statutory or accreditation requirement, **	
Select one: Statutory Requirement☐ **or** Accreditation Requirement ☐	
For demand: Provide labor market information on the current education requirements for the job, including evidence of recent openings for requiring or preferring bachelor's degrees or above. Cite the statute or certifying body, your proposed program is based upon that has specified a bachelor's or above in the field is needed.	NA
For supply gap: Provide employer survey results for local supply for the targeted occupation job title(s) to support that there is a gap or that employers anticipate a gap in the number of qualified applicants that will be available to fill jobs with the new requirements. Survey requirements are listed below.	NA

* Demand is defined by state law as "***an occupation with a substantial number of current or projected employment opportunities.***"

**Applications may include information related to more than one option (i.e., labor market data to support the local demand for the occupation and a local employer survey to support that there is a gap in the number of qualified applicants available to fill jobs).

Survey Requirements:

To verify/support supply demand your survey should include at least 25 individual employer responses. If there are not 25 employers in the area, you should cover the employers who comprise at least 75% of the identified employment base. Provide a copy of the survey with the aggregated results as an appendix. The **survey must address** the following general questions (you may edit the wording to suit your survey):

(1) Do you have anticipated demand for application job title(s)? (If this is a new or emerging job title, include a brief description of specific job duties.)
(2) If there is demand, how many positions do you currently have open? How many do you anticipate having open in the next 3 years?
(3) Is a bachelor's degree a requirement or preference for this position? Requirement: Y or N Preference: Y or N
(4) Do you have difficulty finding Bachelor's degree level applicants for this position? (If yes- explain)
(5) Will the proposed program assist you in finding qualified applicants to fill the position(s)?