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## Executive Summary

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- The information technology cluster consists of six industries responsible for the design, development, support and management of hardware, software, multimedia and systems integration services.
- In 2015, the information technology cluster's employment of more than 83,000 accounted for 1.8 percent of total Ohio employment. During the 2007 to 2009 national recession, information technology employment increased 3.4 percent (2,385), and Ohio's total employment declined 6.8 percent (362,842).
- Within the information technology cluster, computer systems design and related services has the largest share of the workforce, at 69.2 percent and the most number of establishments (7,683).
- Four of the six industries in the information technology cluster are expected to have job growth from 2014 to 2024: computer systems design and related services (12,570), software publishers (1,130), other information services (400), and data processing, hosting, and related services (380).
- About 46 percent of cluster workers are age 45 or older, compared to 45 percent of all Ohio workers. Retirements within the cluster should be similar to retirements in other industries.
- Typical education at entry for 14 of the 25 most concentrated occupations in the information technology cluster is a bachelor's degree, and most of these occupations require no on-the-job training.

## Introduction

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The information technology industry designs, develops, supports and manages hardware, software, multimedia and systems integration services. The information technology cluster is comprised of six industries: software publishers; data processing, hosting, and related services; other information services; computer systems design and related services; computer peripheral equipment manufacturing; and semiconductor and other electronic component manufacturing. Figure 1 shows employment figures for all of the industries in the information technology cluster, displayed according to their North American Industry Classification System (NAICS) codes. In 2015, the information technology cluster employed 1.8 percent of Ohio's total employment, more than 83,000 workers.

**Figure 1. Information Technology Cluster Industries**

NAICS Code	Industry Title	2015 Employment
3341	Computer Peripheral Equipment Manufacturing	1,410
3344	Semiconductor and Other Electronic Component Manufacturing	6,427
5112	Software Publishers	6,020
5182	Data Processing, Hosting, and Related Services	6,043
5191	Other Information Services	5,738
5415	Computer Systems Design and Related Services	57,524

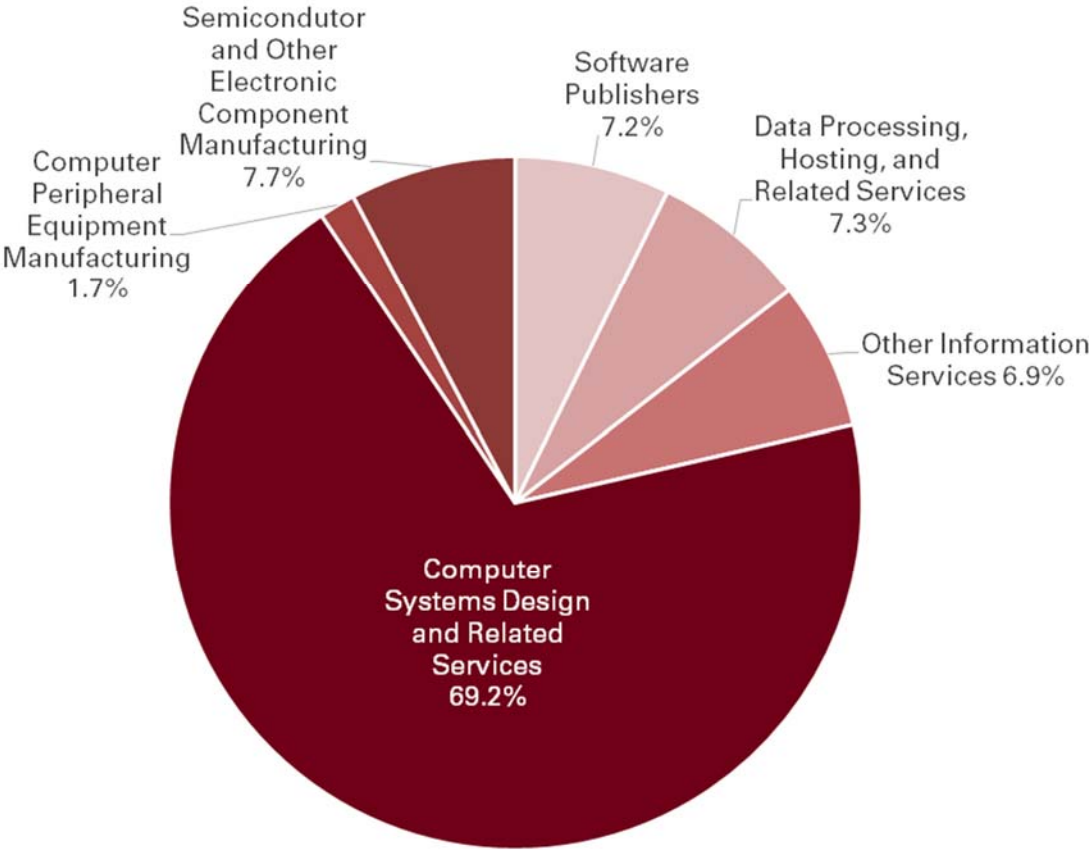
Source: Quarterly Census of Employment and Wages

Ohio is an excellent location for information technology industries that are reliant on travel to America's other commerce capitals. Ohio's geographic location is near more than 60 percent of the U.S. and Canadian population.

# Cluster Composition

Figure 2 shows each industry's share of the information technology cluster's total private employment in 2015. Computer systems design and related services had the largest share of information technology employment, at 69.2 percent. It was followed by semiconductor and other electronic component manufacturing with 7.7 percent; data processing, hosting, and related services with 7.3 percent; software publishers with 7.2 percent; other information services with 6.9 percent; and computer peripheral equipment manufacturing with 1.7 percent.

**Figure 2. Industry Shares of Information Technology Employment, 2015**



Source: Quarterly Census of Employment and Wages

## Industry Employment Concentration

An industry's location quotient (LQ) is a measure of how significant that industry is to a particular region's economy. Figure 3 lists the information technology industries and their corresponding location quotients for Ohio. Values greater than 1.2 mean the industry's concentration of employment in Ohio is significantly greater than the U.S. average. This suggests these establishments serve information technology needs beyond Ohio. Computer systems design and related services has the largest location quotient of the industry cluster at 0.80.

**Figure 3. > Industry Location Quotients, 2015**

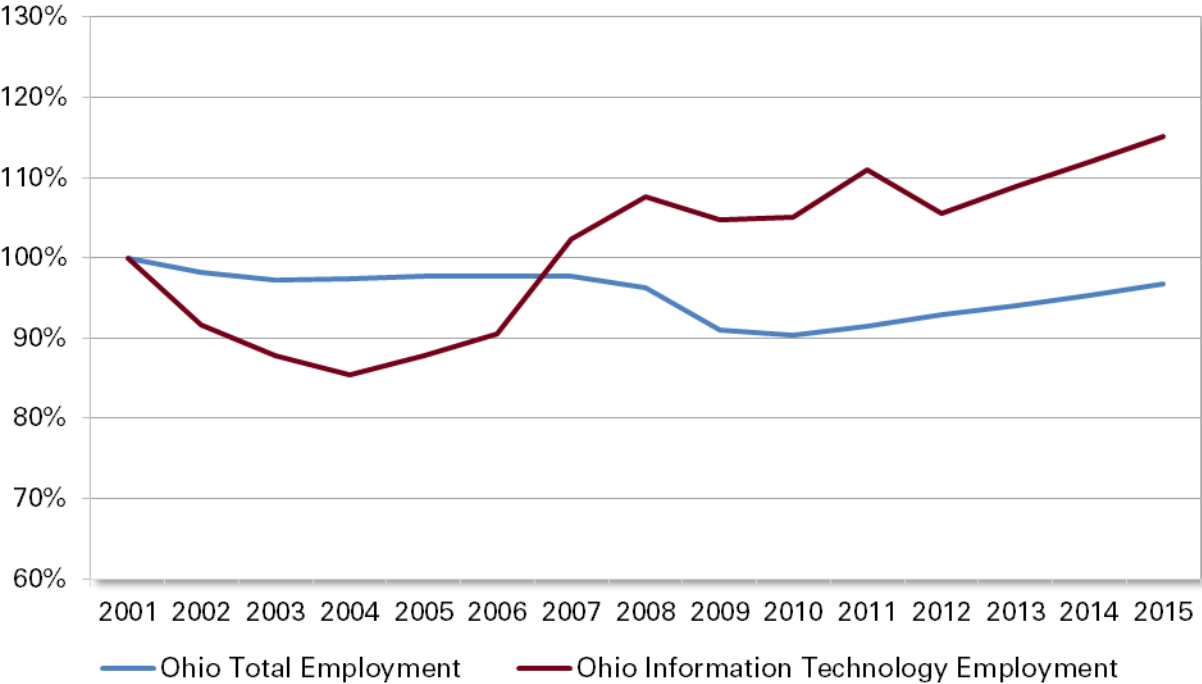
NAICS Code	Industry Title	Location Quotient
5415	Computer Systems Design and Related Services	0.80
5191	Other Information Services	0.63
5182	Data Processing, Hosting, and Related Services	0.54
5112	Software Publishers	0.48
3344	Semiconductor and Other Electronic Component Manufacturing	0.46
3341	Computer Peripheral Equipment Manufacturing	0.23

Source: U.S. Bureau of Labor Statistics

# Cluster Employment Trends

Figure 4 shows the percent change in annual employment for the information technology cluster and Ohio total employment from 2001 to 2015. Both declined following the 2001 national recession. The recession had a greater impact on the information technology cluster than on total employment. From 2001 to 2005 Ohio’s total employment declined by 2.4 percent, while the information technology cluster declined 13.8 percent. The next national recession occurred from 2007 to 2009, during which Ohio total employment declined 6.8 percent, while information technology cluster employment increased 2.3 percent. From 2012 to 2015, the information technology cluster experienced continued growth with a 9.0 percent increase in employment. In 2015 Ohio total employment was 97 percent of its 2001 employment level; the information technology cluster was 115 percent of its 2001 employment.

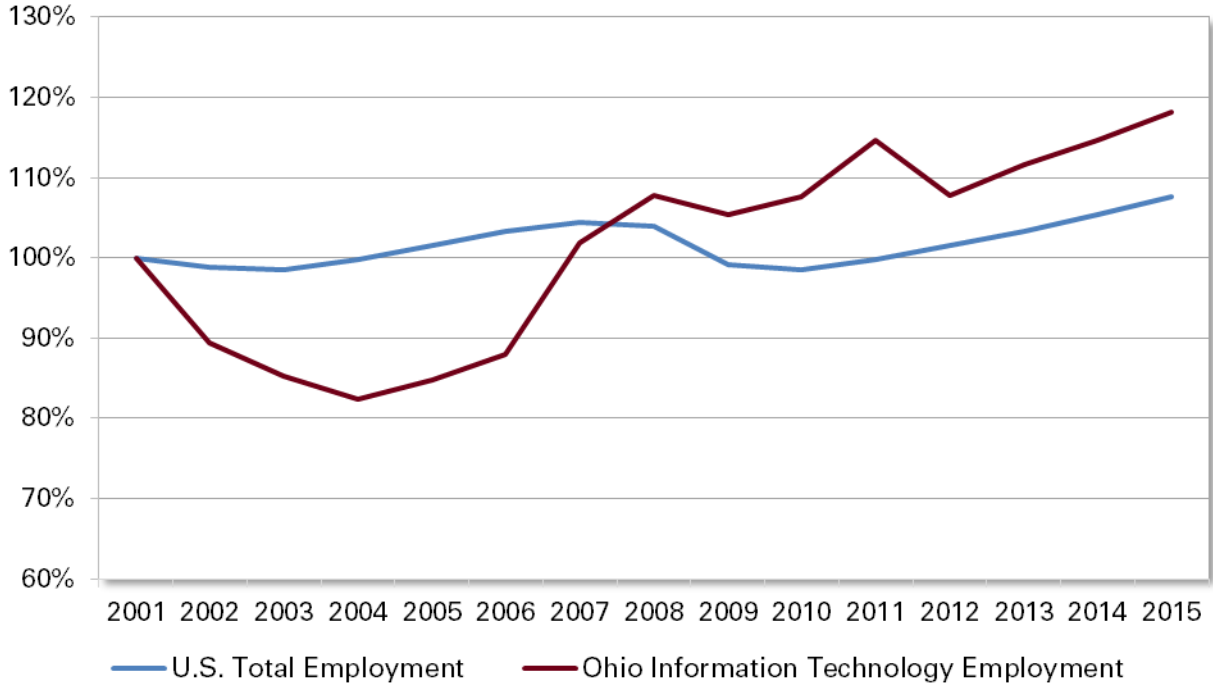
**Figure 4. Ohio Information Technology Cluster and Ohio Total Employment as a Percentage of 2001 Employment, 2001 - 2015**



Source: Quarterly Census of Employment and Wages

Figure 5 shows the percent change in annual Ohio information technology cluster employment and U.S. total employment from 2001 to 2015. The Ohio information technology cluster grew much more quickly than U.S. total employment from 2006 through 2008. From 2012 to 2015, both the Ohio information technology cluster and U.S. total employment were in similar recoveries from the 2007 to 2009 recession.

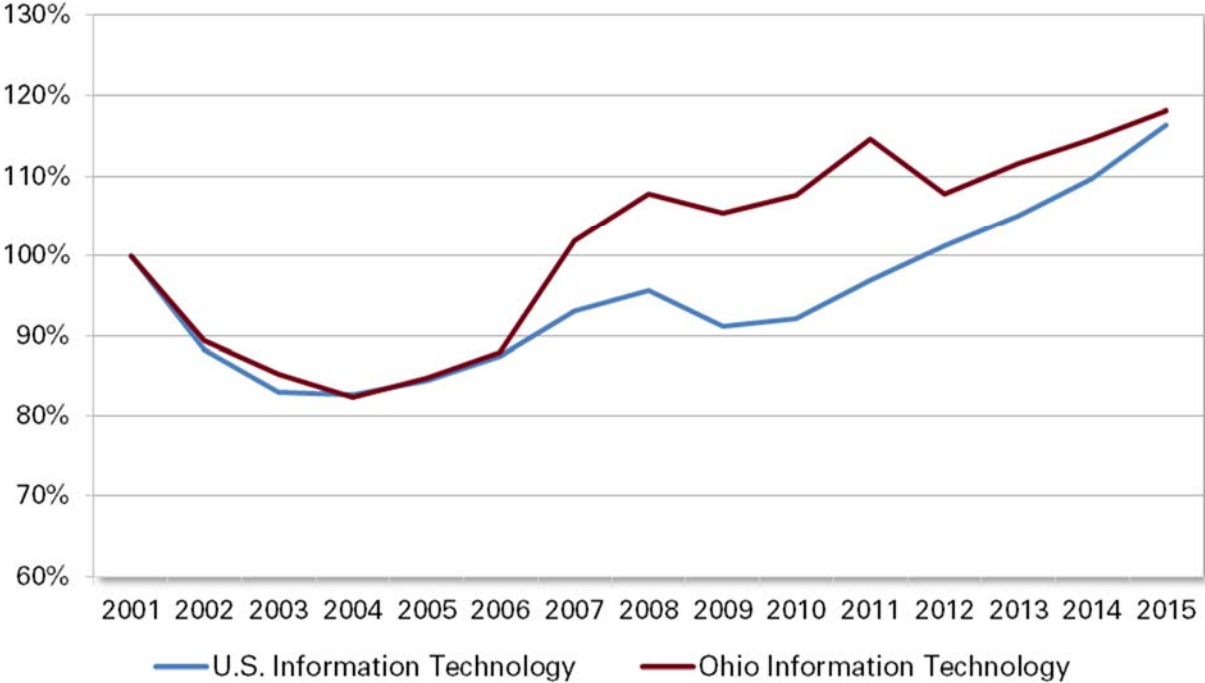
**Figure 5. U.S. Total Employment and Ohio Information Technology Employment as a Percentage of 2001 Employment, 2001 - 2015**



Source: U.S. Bureau of Labor Statistics

Figure 6 shows the percent change in annual employment from 2001 to 2015 for the Ohio information technology cluster and the U.S. information technology cluster. Both experienced similar declines after the 2001 recession. During the 2007 to 2009 recession, Ohio information technology employment grew while U.S. information technology employment declined. From 2012 to 2015, both were in similar recoveries from the 2007 to 2009 recession.

**Figure 6. U.S. and Ohio Information Technology Employment as a Percentage of 2001 Employment, 2001 - 2015**



Source: U.S. Bureau of Labor Statistics



## Industry Employment Trends

This section presents annual employment data from 2000 to 2015 for each of the industries in the information technology cluster. The nation experienced two recessions during this period, in 2001 and from late 2007 to mid-2009, and each industry in the cluster responded to the recessions differently.

### Computer Peripheral Equipment Manufacturing: NAICS 3341

This industry manufactures and/or assembles electronic computers and computer peripheral equipment. It has the fewest jobs of all the industries in the cluster. During the 2007 to 2009 national recession, employment in the computer peripheral equipment manufacturing industry lost 498 jobs (-25.6 percent). From 2000 to 2015, employment in this industry declined by 2,382 jobs (-62.8 percent) and 25 establishments.

**Figure 7. Computer Peripheral Equipment Manufacturing**

Year	Establishments	Employment
2000	51	3,792
2001	53	3,709
2002	42	3,246
2003	42	3,123
2004	34	1,980
2005	31	1,760
2006	32	1,899
2007	30	1,949
2008	27	1,587
2009	26	1,451
2010	23	1,344
2011	25	1,312
2012	25	1,315
2013	22	1,399
2014	23	1,344
2015	26	1,410
<b>Net Change</b>	<b>-25</b>	<b>-2,382</b>
<b>Percent Change</b>	<b>-49.0%</b>	<b>-62.8%</b>

Source: Quarterly Census of Employment and Wages

### Semiconductor and Electronic Component Manufacturing: NAICS 3344

This industry manufactures semiconductors and other components for electronic applications. Semiconductor and electronic component manufacturing experienced its first employment decline in 2001 and has fluctuated since then. Between 2000 and 2015, the industry lost 4,974 jobs (-43.6 percent) and 50 establishments.

Figure 8.

### Semiconductor and Electronic Component Manufacturing

Year	Establishments	Employment
2000	188	11,401
2001	184	10,581
2002	177	8,922
2003	171	7,517
2004	159	6,790
2005	167	6,728
2006	167	6,586
2007	176	6,885
2008	183	7,042
2009	186	6,405
2010	172	6,347
2011	167	6,653
2012	160	6,410
2013	154	6,205
2014	145	6,179
2015	138	6,427
<b>Net Change</b>	<b>-50</b>	<b>-4,974</b>
<b>Percent Change</b>	<b>-26.6%</b>	<b>-43.6%</b>

Source: Quarterly Census of Employment and Wages

### Software Publishers: NACIS 5112

This industry is primarily engaged in computer software publishing or publishing and reproduction. Industry employment declined to an all-time low of 3,019 in 2002. By 2015, it had increased 99.4 percent to 6,020. The number of establishments rose by 233.3 percent from 2000 to 2015.

**Figure 9. Software Publishers**

Year	Establishments	Employment
2000	195	4,150
2001	196	3,645
2002	226	3,019
2003	248	3,262
2004	249	3,588
2005	273	3,649
2006	311	3,541
2007	362	3,448
2008	406	4,647
2009	428	4,693
2010	456	4,975
2011	512	5,142
2012	530	5,601
2013	552	5,593
2014	583	5,494
2015	650	6,020
<b>Net Change</b>	<b>455</b>	<b>1,870</b>
<b>Percent Change</b>	<b>233.3%</b>	<b>45.1%</b>

Source: Quarterly Census of Employment and Wages

### Data Processing, Hosting, and Related Services: NAICS 5182

This industry is primarily engaged in providing infrastructure for data hosting and processing services. From 2000 to 2015, employment increased by 418 jobs (7.4 percent) and 168 establishments. This industry lost 113 jobs (-2.5 percent) during the 2007 to 2009 national recession but gained 1,684 jobs from 2010 to 2015.

**Figure 10.** Data Processing, Hosting, and Related Services

Year	Establishments	Employment
2000	283	5,625
2001	311	5,678
2002	343	5,781
2003	328	5,637
2004	324	5,360
2005	307	4,833
2006	299	4,682
2007	323	4,481
2008	346	4,553
2009	354	4,368
2010	356	4,359
2011	379	4,599
2012	389	4,794
2013	393	5,838
2014	420	5,710
2015	451	6,043
<b>Net Change</b>	<b>168</b>	<b>418</b>
<b>Percent Change</b>	<b>59.4%</b>	<b>7.4%</b>

Source: Quarterly Census of Employment and Wages

### Other Information Services: NAICS 5191

This industry is primarily engaged in supplying, storing and providing information. Employment and establishment data from 2000 are not available. However, from 2001 to 2015, the industry gained 4,616 jobs (411.4 percent) and 348 establishments.

**Figure 11. Other Information Services**

Year	Establishments	Employment
2001	120	1,122
2002	131	1,241
2003	125	1,498
2004	113	1,247
2005	90	898
2006	114	916
2007	240	5,724
2008	266	5,574
2009	279	5,263
2010	285	5,193
2011	318	5,322
2012	382	5,482
2013	431	5,764
2014	436	5,626
2015	468	5,738
<b>Net Change</b>	<b>348</b>	<b>4,616</b>
<b>Percent Change</b>	<b>290.0%</b>	<b>411.4%</b>

Source: Quarterly Census of Employment and Wages

### Computer Systems Design and Related Services: NAICS 5415

This industry is primarily engaged in providing expertise in the field of information technologies. It contributes the most employment for this cluster. From 2000 to 2015 employment, computer systems design and related services gained 11,304 jobs (24.5 percent) and 3,292 establishments.

**Figure 12. Computer Systems Design and Related Services**

Year	Establishments	Employment
2000	4,391	46,220
2001	4,667	45,609
2002	4,594	40,730
2003	4,652	38,976
2004	4,398	39,015
2005	4,584	41,818
2006	4,801	44,232
2007	5,245	49,149
2008	5,472	52,427
2009	5,596	51,906
2010	5,799	53,486
2011	6,181	57,653
2012	6,471	52,181
2013	6,884	53,711
2014	7,212	56,264
2015	7,683	57,524
<b>Net Change</b>	<b>3,292</b>	<b>11,304</b>
<b>Percent Change</b>	<b>75.0%</b>	<b>24.5%</b>

Source: Quarterly Census of Employment and Wages

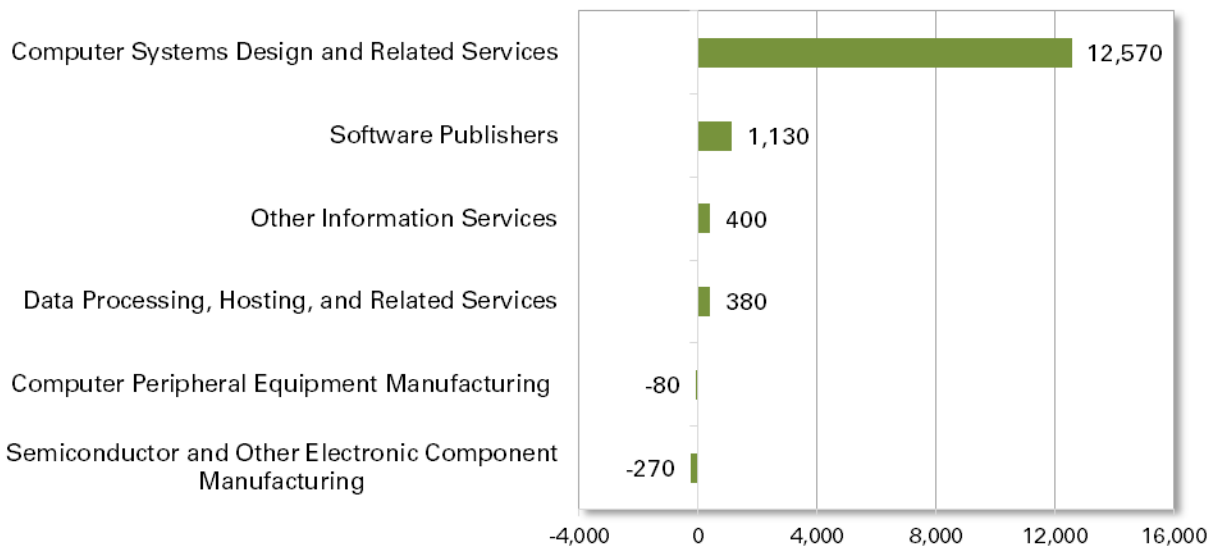
## The Information Technology Workforce

Three factors affect an industry's workforce needs. The first is industry growth or decline. Growing industries need more workers; shrinking industries need fewer. The second is the need to replace workers who leave to work in other industries, for retirement or for other reasons. Even shrinking industries can have significant replacement needs. The last factor is the availability of trained workers or workers who can be trained. The following section examines projected industry employment, worker age and education distributions, and the projected occupational needs for the information technology cluster.

### Projected Employment Change, Ohio 2014-2024

Figure 13 shows the long-term employment projections for the industries in the information technology cluster, which is expected to grow by more than 14,130 jobs from 2014 to 2024. Job growth is primarily expected to occur in the computer systems design and related services industry with as many as 12,570 jobs added (22.4 percent). The software publishers industry expects to add 1,130 jobs (20.5 percent). Other information services is expected to add 400 jobs (7.1 percent). Data processing, hosting, and related services is expected to add 380 jobs (6.7 percent).

**Figure 13. > Projected Employment Change, 2014-2024**

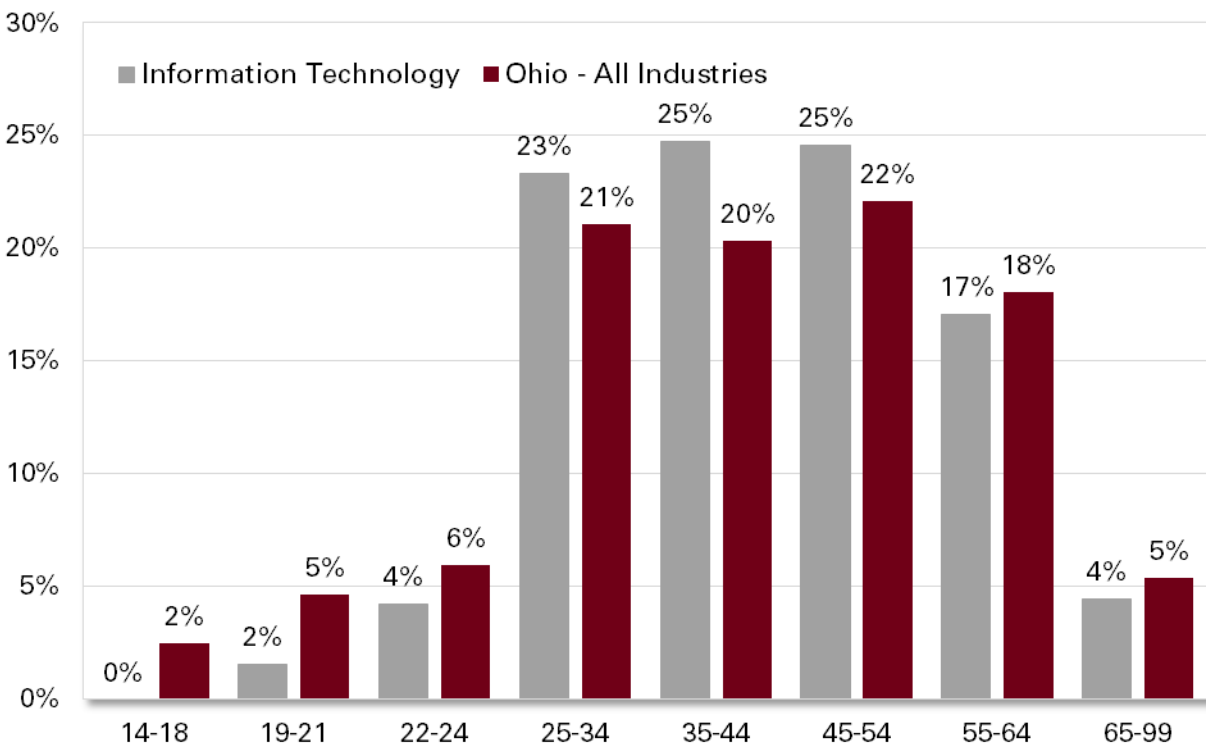


Source: Ohio Bureau of Labor Market Information

## Age Distribution of Ohio Workers

Figure 14 shows the age distribution of workers in the information technology industry cluster compared to all Ohio workers for the second quarter of 2016. On average, workers in the information technology cluster are comparable in age to workers in other Ohio industries. About 46 percent of cluster workers are age 45 or older, compared to 45 percent for all Ohio workers. Replacement needs of retiring workers should be similar in the information technology cluster and other Ohio businesses.

**Figure 14.** Age Distribution of Ohio Workers



Source: U.S. Census of Quarterly Workforce Indicators, 2016 Q2

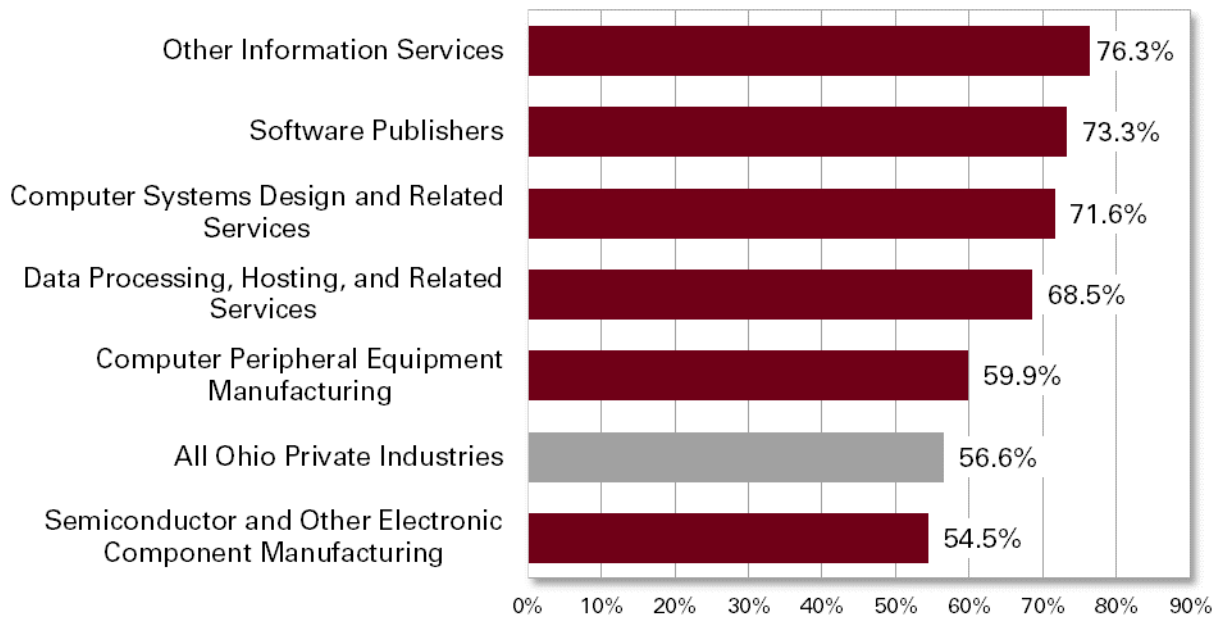


# Information Technology Cluster Education and Training Needs

Figure 15 shows the educational attainment of workers in the information technology industry cluster, specifically the percentage of workers 25 and older with some college education or above.

Across all Ohio private industries, an average of 56.6 percent of workers had some college or above in 2016. Five information technology cluster industries had a higher percentage of employees with some college or above: other information services (76.3 percent), software publishers (73.3 percent), computer systems design and related services (71.6 percent), data processing, hosting, and related services (68.5 percent), and computer peripheral equipment manufacturing (59.9 percent). Among the information technology cluster industries, only semiconductor and other electronic component manufacturing had a lower percentage of these workers at 54.5 percent.

**Figure 15.** Percent of Information Technology Workers 25+ with Some College or Above, 2016



Source: U.S. Census of Quarterly Workforce Indicators, 2016 Q2

Although every business has a unique set of jobs, businesses in the same industry and related industries tend to employ similar occupations. Figure 16 shows the typical education levels, on-the-job training (OJT) and related work experience associated with the 25 occupations that make up the largest share of employment in the information technology cluster. Entrants in 16 of the top 25 occupations typically have an associate's degree or higher. Remaining occupations require at least a high school diploma or equivalent and some OJT.<sup>1</sup>

**Figure 16. Typical Education, OJT and Related Work Experience Needs for the 25 Largest Information Technology Occupations**

SOC Code	Occupation Title	Typical Education Level at Entry	OJT / Related Experience
11-1021	General and Operations Managers	Bachelor's degree	None
11-3021	Computer and Information Systems Managers	Bachelor's degree	None
13-1111	Management Analysts	Bachelor's degree	None
13-1161	Market Research Analysts and Marketing Specialists	Bachelor's degree	None
13-2011	Accountants and Auditors	Bachelor's degree	None
15-1121	Computer Systems Analysts	Bachelor's degree	None
15-1131	Computer Programmers	Bachelor's degree	None
15-1132	Software Developers, Applications	Bachelor's degree	None
15-1133	Software Developers, Systems Software	Bachelor's degree	None
15-1134	Web Developers	Associate's degree	None
15-1141	Database Administrators	Bachelor's degree	None
15-1142	Network and Computer Systems Administrators	Bachelor's degree	None
15-1143	Computer Network Architects	Bachelor's degree	None
15-1151	Computer User Support Specialists	Some college, no degree	None
15-1152	Computer Network Support Specialists	Associate's degree	None
17-2199	Engineers, All Other	Bachelor's degree	None
41-3099	Sales Representatives, Services, All Other	High school diploma or equivalent	Moderate-term OJT
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Bachelor's degree	Moderate-term OJT
43-1011	First-Line Supervisors of Office and Administrative Support Workers	High school diploma or equivalent	None
43-3031	Bookkeeping, Accounting, and Auditing Clerks	Some college, no degree	Moderate-term OJT
43-4041	Credit Authorizers, Checkers, and Clerks	High school diploma or equivalent	Moderate-term OJT
43-4051	Customer Service Representatives	High school diploma or equivalent	Short-term OJT
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	High school diploma or equivalent	Short-term OJT
43-9061	Office Clerks, General	High school diploma or equivalent	Short-term OJT
51-2022	Electrical and Electronic Equipment Assemblers	High school diploma or equivalent	Moderate-term OJT

Source: U.S. Bureau of Labor Statistics

<sup>1</sup> Short-term OJT lasts less than one month. Moderate-term OJT lasts one to 12 months and may include informal training. Long-term OJT lasts more than 12 months and combines work experience with formal classroom instruction.

## Information Technology Cluster Industry Staffing Patterns

A staffing pattern refers to the number and types of occupations typically needed by an industry. The following tables show the most common occupations in each industry's staffing pattern and each occupation's projected employment. The occupations below are described by their Standard Occupational Classification (SOC) code.

### Computer Peripheral Equipment Manufacturing: NAICS 3341

This is a small industry. The largest occupation in this industry is computer, automated teller, and office machine repairers (SOC 49-2011).

**Figure 17. > Computer Peripheral Equipment Manufacturing**

SOC Code	Occupational Title	2014	2024	Numeric Change	Percent Change
49-2011	Computer, Automated Teller, and Office Machine Repairers	114	106	(8)	-7.0%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	69	65	(4)	-5.8%
13-1081	Logisticians	35	33	(2)	-5.7%

Source: Ohio Bureau of Labor Market Information

### Semiconductor and Other Electronic Component Manufacturing: NAICS 3344

The two largest occupations – electrical and electronic equipment assemblers (SOC 51-2022) and inspectors, testers, sorters, samplers, and weighers (SOC 51-9061) – collectively employ over 2,000 people. Only one occupation, industrial engineers (SOC 17-2112), has expected growth; all other occupations in this industry are projecting fewer openings through 2024.

**Figure 18. Semiconductor and Other Electronic Component Manufacturing**

SOC Code	Occupational Title	2014	2024	Numeric Change	Percent Change
51-2022	Electrical and Electronic Equipment Assemblers	1,741	1,666	(75)	-4.3%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	306	293	(13)	-4.2%
51-2092	Team Assemblers	268	257	(11)	-4.1%
17-3023	Electrical and Electronics Engineering Technicians	229	219	(10)	-4.4%
51-1011	First-Line Supervisors of Production and Operating Workers	226	216	(10)	-4.4%
11-1021	General and Operations Managers	136	130	(6)	-4.4%
13-2023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	134	128	(6)	-4.5%
17-2112	Industrial Engineers	128	141	13	10.2%
17-2071	Electrical Engineers	127	122	(5)	-3.9%
43-9061	Office Clerks, General	98	89	(9)	-9.2%
43-5071	Shipping, Receiving, and Traffic Clerks	97	88	(9)	-9.3%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	77	73	(4)	-5.2%
43-5061	Production, Planning, and Expediting Clerks	76	73	(3)	-3.9%
11-3051	Industrial Production Managers	74	71	(3)	-4.1%
43-5081	Stock Clerks and Order Fillers	72	69	(3)	-4.2%
13-2011	Accountants and Auditors	71	68	(3)	-4.2%
51-4121	Welders, Cutters, Solderers, and Brazers	67	64	(3)	-4.5%

Source: Ohio Bureau of Labor Market Information

## Software Publishers: NAICS 5112

Software developers, applications (SOC 15-1132) is the largest occupation in this industry, followed by computer user support specialists (SOC 15-1151). Both occupations are expected to grow by more than 22.0 percent through 2024.

**Figure 19. > Software Publishers**

SOC Code	Occupational Title	2014	2024	Numeric Change	Percent Change
15-1132	Software Developers, Applications	1,047	1,285	238	22.7%
15-1151	Computer User Support Specialists	493	606	113	22.9%
15-1142	Network and Computer Systems Administrators	273	335	62	22.7%
15-1131	Computer Programmers	256	282	26	10.2%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	256	313	57	22.3%
11-3021	Computer and Information Systems Managers	239	292	53	22.2%
13-1161	Market Research Analysts and Marketing Specialists	187	247	60	32.1%
15-1121	Computer Systems Analysts	175	232	57	32.6%
41-3099	Sales Representatives, Services, All Other	138	168	30	21.7%
13-1041	Compliance Officers	130	159	29	22.3%
11-1021	General and Operations Managers	114	139	25	21.9%
13-1111	Management Analysts	110	135	25	22.7%
13-1199	Business Operations Specialists, All Other	100	123	23	23.0%
13-1151	Training and Development Specialists	85	104	19	22.4%
13-2011	Accountants and Auditors	82	101	19	23.2%
15-1152	Computer Network Support Specialists	79	96	17	21.5%
43-9061	Office Clerks, General	76	88	12	15.8%
15-1143	Computer Network Architects	74	90	16	21.6%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical and Executive	71	83	12	16.9%
15-1141	Database Administrators	70	86	16	22.9%
11-2022	Sales Managers	60	73	13	21.7%
43-4051	Customer Service Representatives	57	69	12	21.1%

Source: Ohio Bureau of Labor Market Information

## Data Processing, Hosting, and Related Services: NAICS 5182

The largest occupation in the data processing, hosting, and related services industry is software developers, applications (SOC 15-1132). Many of the occupations in this industry are projected to grow over the next 10 years.

**Figure 20.** Data Processing, Hosting, and Related Services

SOC Code	Occupational Title	2014	2024	Numeric Change	Percent Change
15-1132	Software Developers, Applications	696	894	198	28.4%
43-9071	Office Machine Operators, Except Computer	453	387	(66)	-14.6%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	446	405	(41)	-9.2%
15-1121	Computer Systems Analysts	334	412	78	23.4%
15-1151	Computer User Support Specialists	256	274	18	7.0%
43-1011	First-Line Supervisors of Office and Administrative Support	244	260	16	6.6%
11-3021	Computer and Information Systems Managers	236	252	16	6.8%
43-9021	Data Entry Keyers	232	216	(16)	-6.9%
15-1131	Computer Programmers	167	161	(6)	-3.6%
43-4051	Customer Service Representatives	160	171	11	6.9%
15-1142	Network and Computer Systems Administrators	160	171	11	6.9%
41-3099	Sales Representatives, Services, All Other	126	135	9	7.1%
15-1143	Computer Network Architects	124	146	22	17.7%
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	115	123	8	7.0%
15-1141	Database Administrators	108	139	31	28.7%
15-1152	Computer Network Support Specialists	97	103	6	6.2%
11-1021	General and Operations Managers	79	84	5	6.3%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical and Executive	77	78	1	1.3%
15-1134	Web Developers	70	85	15	21.4%
15-1122	Information Security Analysts	64	88	24	37.5%
43-3021	Billing and Posting Clerks	58	62	4	6.9%

Source: Ohio Bureau of Labor Market Information

## Other Information Services: NAICS 5191

The staffing pattern for other information services is very similar to the pattern for software publishers; the largest occupation in this industry is software developers, applications. Many occupations should see growth over the next 10 years.

**Figure 21. > Other Information Services**

SOC Code	Occupational Title	2014	2024	Numeric Change	Percent Change
15-1132	Software Developers, Applications	649	793	144	22.2%
41-3099	Sales Representatives, Services, All Other	607	644	37	6.1%
15-1121	Computer Systems Analysts	338	387	49	14.5%
11-3021	Computer and Information Systems Managers	315	335	20	6.3%
15-1151	Computer User Support Specialists	241	257	16	6.6%
43-4121	Library Assistants, Clerical	222	213	(9)	-4.1%
13-1161	Market Research Analysts and Marketing Specialists	176	203	27	15.3%
27-3041	Editors	160	171	11	6.9%
25-4021	Librarians	150	136	(14)	-9.3%
11-1021	General and Operations Managers	116	124	8	6.9%
43-6011	Executive Secretaries and Executive Administrative Assistants	113	104	(9)	-8.0%
43-4051	Customer Service Representatives	109	117	8	7.3%
11-2021	Marketing Managers	106	113	7	6.6%
43-4151	Order Clerks	102	98	(4)	-3.9%
13-2051	Financial Analysts	87	92	5	5.7%
15-1142	Network and Computer Systems Administrators	87	92	5	5.7%
11-2022	Sales Managers	87	92	5	5.7%
13-1199	Business Operations Specialists, All Other	86	91	5	5.8%
43-9061	Office Clerks, General	84	85	1	1.2%
15-1134	Web Developers	82	100	18	22.0%
13-1151	Training and Development Specialists	81	86	5	6.2%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	75	68	(7)	-9.3%
15-1143	Computer Network Architects	72	76	4	5.6%
41-3011	Advertising Sales Agents	68	73	5	7.4%
15-1141	Database Administrators	65	70	5	7.7%
13-2011	Accountants and Auditors	57	61	4	7.0%

Source: Ohio Bureau of Labor Market Information

## Computer Systems Design and Related Services: NAICS 5415

This is a large industry. The two largest occupations – computer systems analysts (SOC 15-1121) and software developers, applications (SOC 15-1132) – collectively employ more than 20,000 people. With the exception of computer programmers, all occupations in this industry have expected growth through 2024.

**Figure 22. > Computer Systems Design and Related Services**

SOC Code	Occupational Title	2014	2024	Numeric Change	Percent Change
15-1121	Computer Systems Analysts	10,679	13,872	3,193	29.9%
15-1132	Software Developers, Applications	9,338	11,909	2,571	27.5%
15-1151	Computer User Support Specialists	4,928	6,402	1,474	29.9%
11-3021	Computer and Information Systems Managers	2,721	3,600	879	32.3%
15-1131	Computer Programmers	2,225	1,708	(517)	-23.2%
41-3099	Sales Representatives, Services, All Other	2,075	2,450	375	18.1%
15-1142	Network and Computer Systems Administrators	1,735	2,213	478	27.6%
15-1134	Web Developers	1,650	2,241	591	35.8%
15-1143	Computer Network Architects	1,018	1,203	185	18.2%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical and Executive	1,014	1,138	124	12.2%
15-1141	Database Administrators	980	1,204	224	22.9%
15-1133	Software Developers, Systems Software	963	1,228	265	27.5%
43-9061	Office Clerks, General	963	1,081	118	12.3%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	960	964	4	0.4%
43-4051	Customer Service Representatives	944	1,115	171	18.1%
13-1111	Management Analysts	833	983	150	18.0%
15-1152	Computer Network Support Specialists	828	978	150	18.1%
13-1161	Market Research Analysts and Marketing Specialists	820	1,046	226	27.6%
11-1021	General and Operations Managers	793	937	144	18.2%

Source: Ohio Bureau of Labor Market Information



## Summary

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More than 83,000 Ohioans work in the information technology industry cluster. Ohio's geographic location near more than 60 percent of the U.S. and Canadian population makes it an ideal location. Projected employment growth for more than half the industries in the cluster supports this. While Ohio's total employment declined during the recession of 2007 to 2009, the state's information technology industry cluster experienced employment gains. Educational requirements in the industry cluster are more advanced, as most occupations require a bachelor's degree or moderate on-the-job training.