WHITE PAPER

Enabling Safer, More Secure College Campuses with Cloud Technologies

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IDC OPINION

College and university campuses are no longer the isolated and serene islands they once were. Today's college campuses face the same public safety challenges that the surrounding communities often face, along with the challenges unique to being a college. The result is that campus public safety and law enforcement professionals face the same significant challenges and threats as other law enforcement officers and as such need to adopt similar technologies to protect both the public and themselves.

But colleges and universities, like most public agencies and institutions, face a restricted budget environment — there is some money to spend, but it is not unlimited and needs to be spent wisely. That is why colleges and universities are adopting modern law enforcement technologies such as body cameras, surveillance monitoring systems, IoT sensors, and predictive analytics and data mining, among others, that can expand their services reach and serve as force multipliers for their efforts. All of these new technologies require significant back-end systems and infrastructure to be effective, which is why college public safety and law enforcement agencies are turning to cloud technologies as a viable platform to support the new services, operations, and storage needs in a cost-effective manner.

IN THIS WHITE PAPER

This IDC white paper looks at how college and university public safety and law enforcement agencies are successfully employing new technologies such as mobile; social media; GPS and mapping tools; sound, video, and other monitoring tools; databases and data mining; and other tools to increase their reach and improve campus safety in a cost-effective manner.

To understand the shift that is happening and why colleges and universities are turning more and more to technology to support public safety and law enforcement efforts, one must understand that the change has been spurred forward not only by the availability of the technologies but also by a shift in the nature of the culture of a college campus and a number of high-profile events.

Different colleges and universities have different types of solutions in place to provide safety and security on campus. Some colleges contract with local law enforcement agencies, whereas others have their own certified law enforcement agency. Some employ campus security officers and depend on local law enforcement for more significant incidents, whereas others employ a mix. It is difficult then to use a singular term to encompass all of these different potential scenarios. In this white paper, we employ the terms *campus security, public safety, campus safety,* and *campus law enforcement* interchangeably, though we primarily rely on campus security and use law enforcement to refer to local community law enforcement agencies.

SITUATION OVERVIEW

College campuses have long been places set apart for learning, though this began to shift in the 1960s and the 1970s with the activities of students and the number of colleges and universities and even their locations. Today, college campuses come in a variety of forms, such as community colleges, small rural colleges, and large multicampus universities. In many ways, they are self-contained communities with their own housing, restaurants, community centers, coffee shops, stores, theaters, and sometimes even their own travel agencies and banks. They are also part of a larger external community that may range from small rural towns to suburban towns to large urban areas. There is a significant flow of students and visitors back and forth across a porous boundary as students use and purchase services from the surrounding community and community members take part in activities on campus. These same campuses are more digital now too, from the smart technology in the classroom to using apps and the Web to register for classes and even taking classes online remotely.

"But there are going to be moments as we go forward where we are going to have to come together and figure out how do we stop things like this from happening."

President Barack Obama speaking about the mass shooting at Umpqua Community College, October 2015

When colleges and universities were primarily for the more affluent, funding for schools and campuses was less of an issue. But that has also changed. The rise in the number and the size of the institutions to match the rise in the number of students who want to attend college has also resulted in a significant increase in tuition of 9-18% on average across all types of colleges and universities over the five years preceding 2015, according to the College Board. But that rise in tuition has not been enough to offset the costs that colleges and universities are incurring as they continue to grow. Approximately two-thirds of funding for public institutions comes from state and local governments, and while public funding for public institutions is inching up, it is still below the level preceding the 2007-2009 recession, according to a report by the State Higher Education Executive Officers Association. The result is that even as tuition levels increase and public support slowly inches up, colleges and universities still operate in a fiscally constrained environment.

The students have changed too. Today's average students, likely from a middle-class background, arrive on their college campus with a smartphone, a laptop computer, maybe a tablet device, and a long litany of social channels and applications for learning, staying connected, and managing their everyday life. These students are more aware and lead a more connected lifestyle than their predecessors. They walk around with a computer or smartphone in their pocket and another in their backpack. They are just as likely to conduct study sessions with friends over Skype as they are to meet in the local coffee shop. They use Facebook to stay in touch with hometown and new friends, along with using Twitter to find the best place to go on a Friday night. Homework lists and notes from class presentations are hosted on a SharePoint site or a Web site, and instead of handing in a term paper, they send it to their professor using Dropbox or OneDrive.

With changes in the nature of campuses and students comes a level of criminal activity. Though highly dependent on the location of the campus, criminal activities on campus tend more toward what would be expected in a middle-class suburban neighborhood. These criminal events range from simple assault and petty larceny at the low end to more serious crimes, including rape and murder. Some crimes, such as public intoxication and bicycle theft, are more common on college campuses

than in other areas, but they are in line with the nature of a college campus. There also unique and significant events that, given the contained but open nature of college campuses, seem to happen more often, including mass shooting events and incidents such as the shootings at Virginia Tech, Oikos University, and Umpqua Community College in the United States.

To deal with the changing nature of the college campus, along with the changing nature of the students, college and university public safety and law enforcement agencies are looking at the adoption of new technologies and tools as a critical component in adapting to a rapidly changing culture and the resultant evolving criminal environment while improving the level of safety provided to university assets, students, faculty and staff, and visitors.

Responding to the Change

Given the changes to the nature of the college and university campus and the student body as well as the fiscal constraints, the campus public safety response has also had to change. At a foundational level, college and university administrations, including public safety and law enforcement agencies, are taking a more structured and methodical approach to the issue of crime and campus safety, such as breaking it down into the four elements of an event. Then, by looking at the three components of an event – people, process, and technology – to determine how they are affected by and can affect an event, campus security professionals can have the necessary structure to reduce the likelihood of an event and, if there is an event, determine how to reduce its impact. This allows for the appropriate resources to be in place at the right time in a cost-effective manner.

Four Elements of a Campus Security Event

The foundation for a systematic approach to campus security is understanding the timeline and evolution of a public safety event, whether it is petty larceny or something more serious such as an active shooter incident. Most college and university public safety agencies employ a more thoughtful and coordinated approach to the types of events that could and can occur on a college campus that takes into account the timeline of a potential or actual event. As a foundation, most colleges and universities use a common emergency services and public safety four-step approach to campus security:

- **Prevention.** Employing the necessary resources and technology to prevent or reduce the possibility of a campus security issue or event (This would include identifying and assessing different risk factors and enacting preventive measures to reduce risk.)

- **Preparedness.** Having the people, processes, and technology prepared and able to mobilize for different campus security scenarios (This would also include education efforts for students, faculty, staff, and visitors about different campus security efforts along with what to do in an emergency.)

- **Response.** How the public safety agency, along with the rest of the campus and the community, reacts and responds to an incident or event (This would include the immediate de-escalation of the incident or event and protection of people, assets, and information or evidence.)

- **Recovery.** The timely and appropriate resumption of normal operating procedures (Note that this may not include all operations and is dependent on the nature of the incident but should be seen as a majority of operations and activities returning to normal as is possible.)

Building Blocks for a Safer Campus

Though new technologies are a critical component of public safety and at this stage likely the most critical component, improvements to public safety can't focus on technology alone and still be effective. Efforts to make a campus safer need to focus on the three key building blocks: people, process, and technology. Although they are independent categories, they are highly intertwined. All three together provide the most effective public safety approach.

People

These are the people who either have a direct role or are significantly affected by any changes in public safety efforts. The change possible in this area focuses on three aspects – employing more resources, providing better training and education for resources, and educating the community. Employing more resources, or the hiring and deployment of more campus safety officers, is an effective but cost-prohibitive approach because eventually the additional cost to hire one more officer does not demonstrate a measurable and appropriate reduction in crime. Better training professional campus safety and direct support staff also improves outcomes up until the point of diminishing returns. Educating the community, including faculty and staff, students, and visitors, can provide a measurable reduction in crime and incidents (e.g., encouraging students to better secure their laptops in the library). Again, though, the cost of additional education and the employment of that education by the community eventually will reach a level of maximum effectiveness with no more improvement possible without significant additional investments.

> *"We have been able to reduce crime by using technology, for example, by resource targeting to reduce burglaries."*
>
> *Michael Diekhoff*
> *Chief of Police*
> *Bloomington, Indiana*

The people category is further broken down into the following categories:

- **Campus public safety staff.** Campus public safety staff are professional staff, including law enforcement, public safety, and direct support staff, who are responsible for safety and security on campus. The largest and most cost-effective improvements include additional staff up to a point and less so training for that staff.

- **College faculty and staff.** College faculty and staff are the long-term residents of a college. Whereas students are on campus for only four to six years on average, faculty and staff are community members for decades. The result is that faculty and staff have a better long-term perspective on what is happening on campus, trends, and indicators of a potential issue and are a source of information for law enforcement and safety efforts. The most cost-effective efforts with faculty and staff include building long-term relationships that yield potential intelligence and better educating them about actions they can take to reduce crime and incidents. For example, in many local school districts, teachers and staff have gone through training and drills on what to do during an active shooter incident. The same training, or something similar, for college faculty and staff may help contain or prevent a future incident on campus.

- **Students.** As primary consumers of public safety services, students play multiple roles, including perpetrator, victim, person reporting the incident, and concerned bystander. It should be noted that students include both residents on campus and commuter students who are on campus just for the day or for classes. Much of the effort with students is similar to that with faculty – educating them about crime and incident prevention, the processes and plans for what to do if an incident were to happen, and how technology is being used to protect them and the campus.

- **Community emergency services providers.** Law enforcement and emergency personnel are a key source of resources and support during an incident, and as such, coordination about policies, directives, plans, and technology between on-campus and off-campus agencies is critical.

- **Visitors.** Colleges and universities tend to see a significant influx of visitors (e.g., vendors) on a daily basis and during special events such as athletic events. Often, visitors are significantly more difficult to educate about campus security efforts because of access issues – they are not on the campus networks or there is a lack of awareness about exactly who is on campus – or because they don't use a minimum level of technology that most others on campus do. The fact that they are more difficult to educate doesn't remove the need to make the effort to inform and educate them.

Process

This component includes having the necessary policies and processes in place to adequately prepare for and respond to an event or a series of events. In addition, it includes in this context the necessary policies, processes, and guidance related to the selection of appropriate technologies.

- **Policies and directives.** Policies and directives are the foundational documents and agreements on how the campus has decided to handle the four elements of a public safety incident, including roles and responsibilities. These policies and directives can be as simple as campus regulations for students and as complicated as the different interagency response and support agreements that cover different scenarios.

- **Business continuity plans.** These plans cover how the campus and university will continue to operate in the face of a significant event, such as a natural disaster or an active shooter incident.

- **Technology selection and procurement.** The technologies used and employed in campus public safety efforts are both the same as regular commercial technologies and unique to public safety. However, their uses can be significantly different and result in unintended consequences, such as violations of student privacy. It is for this reason that both standard university technology selection and procurement policies and additional technology selection and procurement policies specific to public safety and law enforcement need to be in place and followed.

Technology

The technology component involves the application of tools and technologies in law enforcement, safety, and tangential roles. Technologies, when appropriately and effectively applied, contextually have the opportunity to provide a significant return on investment in improving campus safety compared with either people or processes. For example, it is cost prohibitive to station a security officer at every bike rack to prevent bike theft on campus. Putting in place directives and other processes that determine how often the areas around the bike racks are patrolled has the potential to reduce bike theft and is more cost effective than stationing a security officer at each location. However, applying technology such as cameras and video monitoring is a lower-cost option than an onsite officer and could have a much more significant preventive effect.

Within the context of campus security, we have further broken the technologies down into three subcategories as follows:

- **Information gathering.** Technologies used to actively and/or passively gather information as part of preparedness, prevention, and response efforts:
  - **Video cameras.** This technology includes stationary cameras such as surveillance cameras, dash cameras, and body cameras worn by officers. It also includes the back-end resources necessary to watch, store, and analyze the information captured by video cameras.
  - **Microphones.** Microphones are devices used to detect sounds as a primary indicator of an issue along with supporting analytical tools. Common uses of microphones in law enforcement and public safety include technologies such as gunshot detectors, glass break detectors, and microphones on officers that are used in conjunction with body and dash cameras.
  - **IoT sensors and devices.** This technology includes a wide variety of sensors and supporting infrastructure employed for campus security such as smart door sensors, physical security and access devices, and monitoring the location, use, and availability of university assets such as a medical device in a campus hospital.
  - **License plate readers.** A specialized system that includes cameras, monitoring software and hardware, and analysis technologies is employed to read and record the license plates of targeted vehicles, such as cars entering and exiting a parking garage or parking lot. It may be tied to a payment system, a registration and access system, or additional cameras that record who the driver is.
  - **GPS technologies.** GPS technologies are often employed in conjunction with mobility technologies or IoT technologies and are tied to monitoring the location of people or assets such as law enforcement officers, vehicles, or medical equipment.
- **Information storage, management, and analysis.** Tools and technologies that are used to store, manage, manipulate, and analyze different types of data and content, ranging from information in forms to video and audio content:
  - **Cloud services.** This is an IT services model for enabling convenient, ubiquitous, and scalable on-demand access to a shared pool of configurable computing resources capable of storing, processing, encoding, and analyzing data in a third-party environment or center.
  - **Analytics and data mining.** Anyone in a Western country produces a significant digital trail as a normal product of living. College students, tending to be younger and having a higher digital aptitude, probably leave larger digital trails. In addition, significant amounts of other data, including video, audio, and records, are produced on and around a college campus. All of this information, with the proper safety and security protocols in place, can be mined and analyzed to identify criminal trends, potential threats, and other information beneficial to keeping the campus secure.
  - **Geospatial mapping and analysis tools.** These tools employ statistical analysis of data that has a geographical or location aspect, such as in the mapping and analysis of criminal activity.

"There is a mind shift in law enforcement around new technologies that needs to take place. It can be very beneficial, but there has to be buy-in from the street officer to the Chief's office."

Michael Diekhoff
Chief of Police
Bloomington, Indiana

- **Communications and information sharing.** Communications and information sharing are the lifeblood of law enforcement, whether between an officer and the public, between a dispatcher and an officer, or between agencies:

  - **Emergency communications systems.** Emergency communications systems are the nerve networks of campus security. It is through these networks that reach across locations, devices, and channels that people can be educated and informed about campus safety. The emergency communications system itself is the primary communications system for both on-campus and off-campus law enforcement emergency services agencies.

  - **Mobile devices.** The explosion of mobile devices has not left campus law enforcement untouched. Like almost every student and faculty member, most law enforcement officers also carry smart devices including smartphones and tablets that are used as a regular part of their work.

  - **Enhanced cellular networks.** Significant parts of college campuses are brick or concrete buildings and are thus difficult to reach through a normal cellular network. Enhanced cellular networks allow students and faculty to be reached via automated calls, emails, and text messages on their smartphones.

  - **Social media.** Most college students and faculty members are heavy users of social media. They use it in their everyday lives to keep track of everything from friends to assignments to relationships. Social media can provide an excellent channel to gather information and share information on public safety. This can include both general educational information and immediate information about an ongoing public safety incident or event. What makes social media different is the immediacy of the channel. Students, faculty, and visitors can all be communicated with in real time and as needed.

"There are a broad set of threats on college campuses, from internal staff not following security protocols to students creating vulnerabilities to external threats. All of these can be better defended against using technology."

CIO
University of California
Hastings College of the Law

Integrating the Disparate Parts

People, processes, and technologies are all critical to effectively managing safety on campuses. But it also requires a structure for integrating and operating across the network of people and the different policies and processes and integrating the disparate technologies to form a cohesive whole that moves the law enforcement and safety mission forward in a restricted budget environment. What makes this even feasible are cloud technologies and hosted solutions such as Microsoft's integrated cloud services platform, Azure.

"Though law enforcement agencies often have the option of on-premise or cloud storage, there are significant benefits to the cloud over on-premise if the agency examines the ease, scalability, security, and power of a cloud option such as the Microsoft Azure Government Cloud."

Joe Pioli
Vice President of Sales
VIEVU

Technologies such as video cameras – whether they are above an ATM, inside a parking garage, or monitoring a football stadium when it is closed – collect an immense amount of information and data. This data needs to be stored, analyzed, and potentially retained for evidentiary purposes. At the same time, this data can only be held in accordance with a data retention and destruction policy. Using integrated tools, prebuilt templates, and managed services in a hybrid cloud environment provides a flexible platform to collect, store, encode, retrieve, and analyze data. At the same time, if necessary, it can store the content indefinitely or it can automatically destroy the content in accordance with a data retention policy. In this example, a cloud platform such as Microsoft Azure provides the necessary space and computing power for the technology and enables simple following of a policy and process for data retention.

Policies and processes are also easier to manage from a central location and in a cloud environment. For example, employing mobile technologies such as tablets and smartphones as a platform to construct reports and collect evidence and store them in a central location is possible and easier to manage in a cloud environment. Other policies and processes such as dorm and building access policies can be managed across a broad network, including retaining information such as who went where and when, if it becomes necessary to know. On a large college campus of 25,000+ students and another 5,000-10,000 faculty and staff, managing coordinated and integrated access to physical buildings and IT networks is not a simple undertaking, but it is made easier through the use of a cloud platform instead of separate local systems.

FUTURE OUTLOOK

The key trend in technology for campus security and law enforcement agencies, beyond the continued adoption of additional and more advanced technologies, will be around building a sustainable and robust architecture on which all of the additional technologies can be integrated. Microsoft Azure and partners that rely on it will be a key aspect of this. The trend will be less about purchasing overall IT infrastructure, including hardware and software, specifically for campus safety and more about building a sustainable and flexible infrastructure in the cloud that can scale and handle the software, the data, and the analysis that are required in modern law enforcement.

Microsoft Azure services are becoming a key enabler for campus safety solutions that are able to gather, store, share, and analyze information, content, and communications, including audio and video files, large data files, and the analytics tools necessary to understand normal trends and outlier behaviors on campus and be highly available when something goes wrong.

CONCLUSION

University law enforcement agencies need specialized tools and technologies to accomplish their mission of providing a safe environment on campus. What they don't need to be doing is managing back-end IT hardware and software to support that mission. In the past, this might have been outsourced to the university IT department, but often, the university IT department does not have adequate resources or budget to effectively handle all of the software, technologies, and data that law enforcement agencies need and collect.

Over the long term, college public safety agencies need to explore cloud and hosted solutions such as Microsoft Azure, both as a key architectural piece in their IT portfolio and as a platform from which a number of other technologies can function. Microsoft offers a number of partner-led solutions in the campus safety and security space as a part of its school management suite of solutions, including security and access control, video monitoring, student and teacher safety, emergency notifications, and parking optimization.

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