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NEC Innovation Series

Safer cities through information sharing

NEC's MAG1C Suite is helping to create safer cities around the world

Something is wrong. A stadium is half empty, less than an hour before the big game starts. Quickly, the city's response center scans the data.

Game tickets have been sold, trains are full, but the streets are empty. Video feeds from the rail station show an equipment failure, preventing the fans from leaving the station. There is a risk of a stampede. The response center alerts emergency services and the transportation company. Boards at the station show messages redirecting the fans, averting chaos.

As the fans walk to the stadium, face-recognition software identifies a known hooligan and alerts the center. Quick proactive responses by law enforcement stop trouble before it starts, and the game proceeds smoothly.

Dr. Paul Wang, Chief Technology Officer, Global Safety Division

NEC's vision of the safer city, the MAG1C (Multi AGencies, 1 Concert Solutions) Suite, would allow such scenarios to play out. By aggregating feeds from sensors, distributing them for analysis and recommending courses of action to be fed to the appropriate agencies, civic authorities can respond to untoward events in a comprehensive and holistic way.

Breaking down the silos

The events above are hypothetical, but real-life incidents often involve many official agencies. These include public and private transportation issues, problems of crime and civic disorder, fires, traffic and construction accidents or natural disasters, and each might require cooperation between agencies.

To ensure efficient reactions, responsible agencies may each employ their own sensors (cameras, air monitors, smoke detectors, etc.) which often overlap, and provide identical data to different users. This produces redundancy of information and is cost-inefficient, highlighting the need to break down silos and share information.

Dr. Paul Wang, Chief Technology Officer and Head of Strategy & Management for NEC Corporation's Global Safety Division, says, "In one city there are over 60 cameras on one streetlight looking at a particular road. Imagine 60 cameras on a lamppost! Can it be more efficiently run?"

Collaboration between silos promotes efficiency, and the MAG1C Suite Inter-Agency Collaboration (IAC) collection of middleware modules does exactly that.

From raw data to decisions

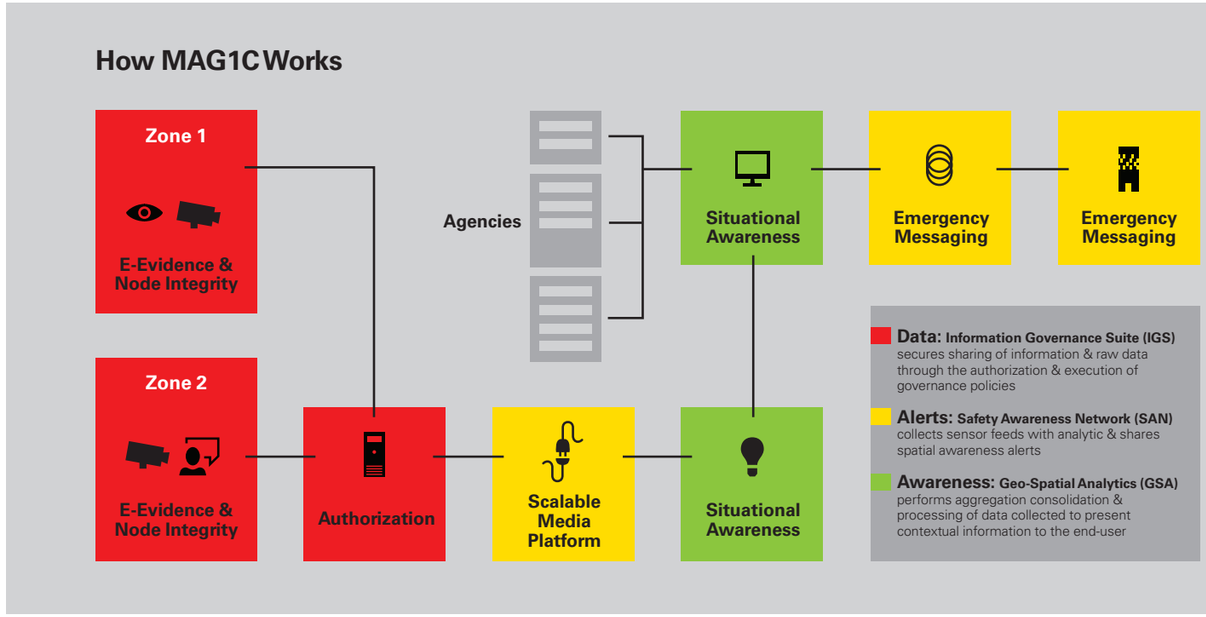
Data from sensors processed by the MAG1C Suite passes through three major stages, each further divided into specific modules. MAG1C Suite's Information Governance stage provides authorization, device integrity, and non-repudiation and integrity measurement (only listed devices and signed apps may pass data), ensuring that information fed to the next stage can be trusted.

In conventional systems, each agency would operate its sensors within closed networks. Data from the MAG1C Suite system, however, is distributed in a responsible, "need-to-know" manner. Here, the MAG1C Suite provides not only firewalled distribution to the relevant agencies, but also a scalable platform that controls the analytic engines interpreting the data.

Such data interpretation is aided by technology such as NEC's own award-winning NeoFace® face-recognition software, and image and video analytic engines, and also third-party products, accessible through an open API.

Wang calls this "bring your own engine," and emphasizes that it allows different agencies to use their own need-specific tools. The system provides flexibility and customization, enabling smart pooling of resources without forcing technology choices on individual agencies. Further, efficiency and cost-effectiveness are increased significantly, since redundant resources are eliminated.

BRYAN VAN DER BEEK/BLOOMBERG



For example, the video feed from a single camera can be passed to two different agencies, both interpreting the raw data in their own ways (a police department may use face recognition to spot known criminals, while a transportation agency may simply scan the images for crowding situations).

Finally this analyzed, but still unstructured, data is interpreted, and converted into alerts, using Big Data techniques. Alerts are then passed to the appropriate agencies, allowing a timely response, as outlined in the stadium example above.

The MAG1C Suite also integrates with any OGC (Open GeoSpatial Consortium) compliant platform, allowing the overlay of event information in a geospatial format, resulting in agencies having greater situational awareness and increased readiness.

Singapore: The Safe City Test Bed

Wang has worked on the development of technology providing coordination between multiple agencies with varied missions, and accordingly, NEC was selected as the leader of seven companies comprising a consortium to design a Safe City Test Bed for Singapore, using the MAG1C Suite technology.

Singapore is a natural choice for such a development, given the relatively small size of the country (3.5 times that of Washington, D.C.) and high population density, but also, according to Wang, "the users there are enthusiastic, and they are supportive and willing parties." The Ministry of Home Affairs and the Singapore Economic Development Board are the lead agencies, with many others participating.

Safety around the world

The "safer city" concept, which may be defined as incorporating effective government empowered by a mix of technologies, is rapidly gaining in popularity around the world. For example, India's Prime Minister Narendra Modi has announced plans for India to implement 100 smart cities, where "safer city" often forms a key design component.

Out of 37 megacities (over 10 million inhabitants) projected by 2025, many have "safer city" development plans. Other communities, such as Tigre, Argentina (380,000 residents in 2010), are already exploring the concept. Tigre signed a memorandum of agreement with NEC in 2013, and NEC has been providing the command and control system platform to the city. Sergio Massa, former Tigre mayor, emphasizes that "technology…is essential in providing this security and safety."

What's next?

Using "a very iterative" model, according to Wang, NEC is fine-tuning the current Singapore system, using more than 30 multi-agency use cases and data mining technologies, together with feedback from relevant agencies. Lessons learned can be applied to cities worldwide wanting to implement the "safer city" concept. Naturally, there is no prescription that works for all cities. The flexible nature of the NEC solution allows cities to customize the "safer city" concept to meet their individual needs, with the next phase of Smart Cities becoming "Smart Nations," with more sensors, where NEC can be expected to play a big role. — *Hugh Ashton*