Secure Vehicular Access Gateway
– *A Platform for Infotainment and Remote Services*

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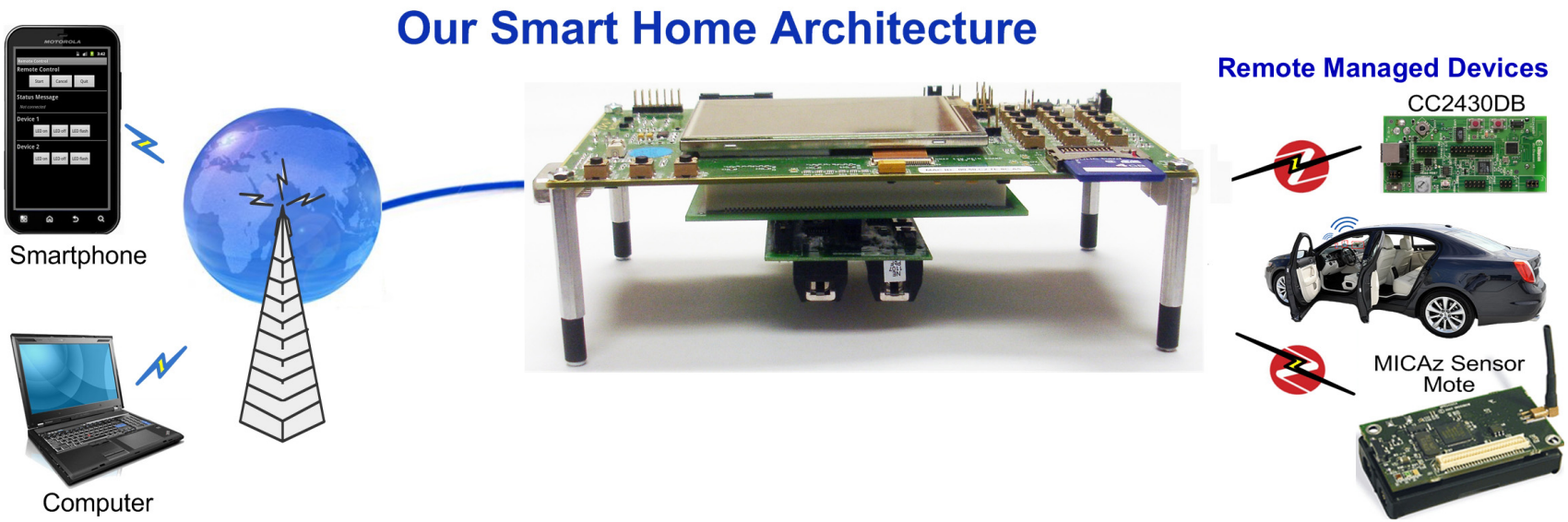
Our Mission

- Design and develop cryptographic algorithms and network security solutions for the next generation Internet, wireless networks, and IoT networks where security and efficiency are of major concerns.
- We have both hardware and software platforms for design and evaluation of the secure communication systems.
- Our research has been supported by National Science Foundation and Air Force Research Labs.

Secure Vehicle Access Gateway (SVAG)



- We have developed a secure access gateway (SAG) for smart grid/home. The project is funded by the National Science Foundation.
- SAG enables the home electronic devices to be remotely controlled, monitored and operated.

Secure Vehicle Access Gateway

- **Cryptographical security**:
  - One-time login name and one-time cryptographically secure authentication.
  - The unique design makes SVAG secure from security attacks.
- **Secure remote access and service**: using the built-in ZigBee security defined in IEEE 802.15.4 for secure communications with On-Board Diagnostic Systems (OBD-II) and electronic units directly.

Secure Vehicle Access Gateway

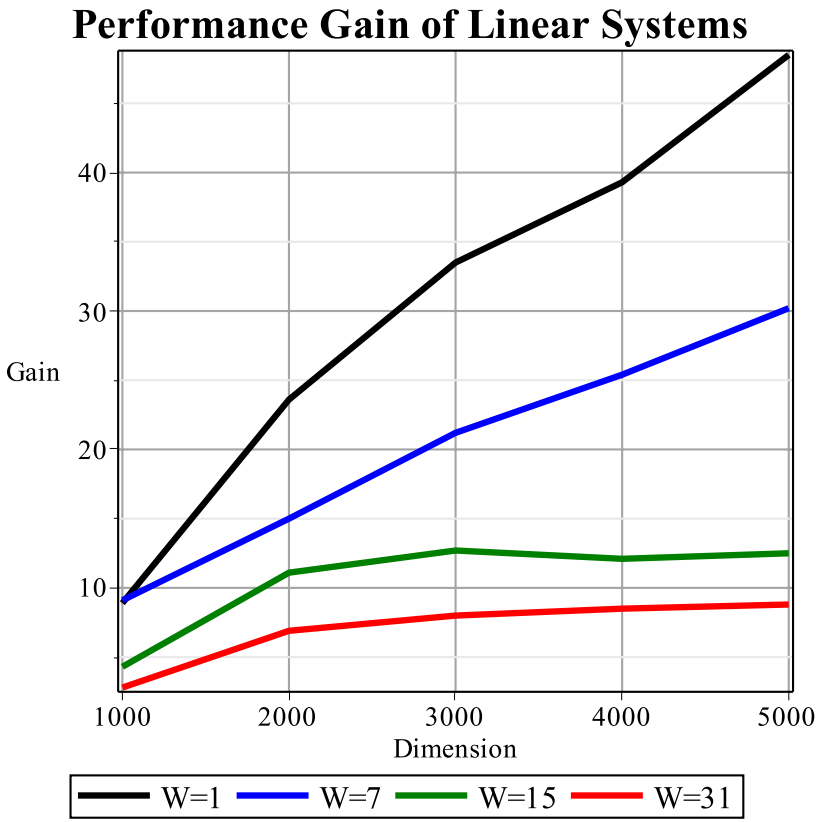
- **Secure and efficient platform for infotainment**: The built-in gateway provides vehicles with much enriched services at request while enforcing strong privacy protection through ***a single point of access.***

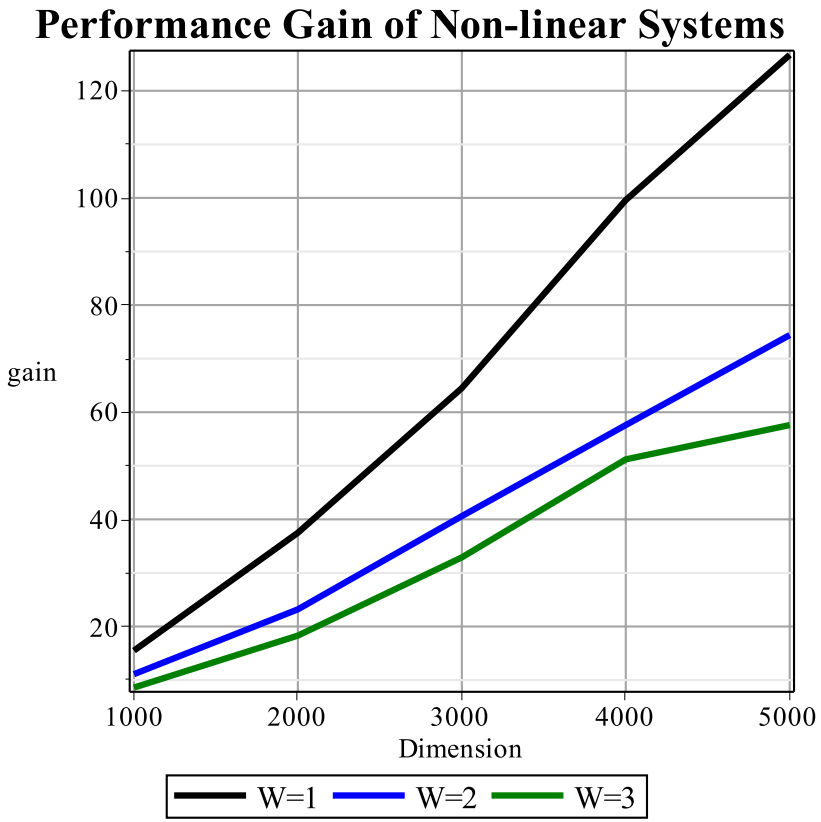
- **Low latency**: Compare to the WiFi like connection oriented Bluetooth meshing (IEEE 802.11s), the ZigBee (IEEE 802.15) is packet oriented, the latency is much more suitable for meshing protocol.

- We have developed software for Android smartphones to securely remote connect to the SVAG and ZigBee enabled devices.

Infotainment – *Cost-Aware Computation Outsourcing*

- To facilitate the vehicles with capabilities to access comprehensive cloud computational resources, we develop **cost-aware secure computing outsourcing** schemes to outsource the computationally intensive operations from the vehicles to the shared cloud servers.





Infotainment – *Secure and Optimal Data Storage*

- Distributed storage provides data security while ensuring data availability **without** using data encryption.
- It provides a cost-aware design trade-off between storage and multimedia data security for the vehicular systems.
- We formulate it as the following optimization problem and developed the optimal schemes under adversarial attacks:

  maximize the number of corrupted symbols that can be repaired **subject to** the given storage efficiency

Infotainment – *Secure and Optimal Data Storage*