Intelligent Network Flow Optimization (INFLO)

- Intelligent Network Flow Optimization (INFLO) bundle of applications:
  - Dynamic Speed harmonization (SPD-HARM)
  - Queue Warning (Q-WARN)
  - Cooperative Adaptive Cruise Control (CACC)
Dynamic Speed Harmonization (SPD-HARM)

- Dynamic Speed Harmonization (SPD-HARM) aims to dynamically adjust and coordinate vehicle speeds in response to congestion, incidents, and road conditions to maximize throughput and reduce crashes.
  - Reducing speed variability among vehicles improves traffic flow and minimizes or delays flow breakdown formation
  - Utilize V2V and V2I communication to coordinate vehicle speeds
  - Provide recommendations directly to drivers in-vehicle
  - Recommend speeds by lane, by vehicle weight and size, by pavement traction
Queue Warning (Q-WARN)

- Queue warning (Q-WARN) aims to provide drivers timely warnings and alerts of impending queue backup.
  - To reduce shockwaves and prevent collisions and other secondary crashes
  - Predict location, duration and length of queue propagation
  - Utilize V2V and I2V communication for rapid dissemination and sharing of vehicle information
    - E.g., position, velocity, heading, and acceleration of vehicles in the vicinity
  - Allows drivers to take alternate routes or change lanes
  - Applicable to freeways, arterials, and rural roads
Cooperative Adaptive Cruise Control (CACC)

Cooperative adaptive cruise control (CACC) aims to dynamically adjust and coordinate cruise control speeds among platooning vehicles to improve traffic flow stability and increase throughput.

- Closely linked with SPD-HARM to reduce stop-and-go waves
- Utilizes V2V and/or V2I communication to coordinate vehicle speeds and implement gap policy

**Without CACC:**
- Irregular braking and acceleration
- Longer headways
- Lower throughput
- Risk of rear-end collisions

**CACC Enabled:**
- Coordinated speeds
- Minimized headways
- Higher throughput
- Reduced rear-end collisions

1. Lead Vehicle broadcasts location, heading, and speed
2. CACC-enabled following vehicles automatically adjust speed, acceleration, and following distance
3. Any speed or acceleration perturbations by Lead Vehicle can be instantly accounted for by following vehicles utilizing V2V communication
4. TMC observes traffic flow and adjusts gap policy to manage road capacity

[Image: Diagram showing the benefits of CACC compared to non-CACC conditions]