

## Overview

Built on Intelight's award winning MaxTime ATC Framework, MaxAdapt local controller software is a system-free traffic adaptive solution that runs on local traffic signal controllers and optimizes cycles, splits, and offsets along traffic signal corridors in real-time. Contrary to black-box solutions, MaxAdapt algorithms are based on the signal timing performance metrics developed by Purdue, Indiana DOT, and Utah DOT. Contact Intelight today to see how MaxAdapt can help update your signal operations system to 21<sup>st</sup> century technology.

The screenshot shows the MaxAdapt Database Editor web interface. The browser address bar displays '192.168.1.22:8080'. The Intelight logo is visible at the top left. A navigation menu includes 'Home', 'Print', 'Manual', and 'Mobile'. Below this, there are sections for 'Front Panel Emulator', 'Status', 'Parameters', and 'Administration'. The main content area displays 'MaxAdapt 1.0.1'. A callout box highlights the following configuration parameters:

- Operational Mode: COS
- Data Collection Cycles: 2
- Minimum Cycle Length: 50
- Maximum Cycle Length: 200
- Min Required Score: 0
- Req. Offset Gain: 2
- Add. Cycle Gain: 2
- Forward Bound Weight: 1
- Backward Bound Weight: 1

Below the callout, a table displays the following data:

Adj. Num	Start Time	Adaptive Cycle Length	Adaptive Offset	Score	Sent To Controller
1	Tuesday February 16 2016 11:24:18	120	90	53	Yes
2	Tuesday February 16 2016 11:12:17	120	90	51	Yes
3	Tuesday February 16 2016 11:06:17	120	90	50	Yes
4	Tuesday February 16 2016 10:56:16	120	90	62	Yes

## Highlights

- Adaptive cycle, offset, and split optimization
- Uses high resolution data (1/10<sup>th</sup> second logged on local controller)
- Uses distributive processing to optimize signal timings. No need for a master or system processor
- Runs alongside MaxTime local signal control software on the industry standard ATC API
- Dedicated web and text user interfaces
- Robust peer-to-peer sync. mechanisms
- Compatible with MaxTime transit priority, preemption, advanced phase and coord options, user logic, etc.
- Quick and efficient transition between plans when coupled with MaxTime's Critical Path Transition Algorithm
- Detection requirements consistent with Purdue, INDOT, UDOT Signal Performance Metrics (SPM) requirements

## Unique platform

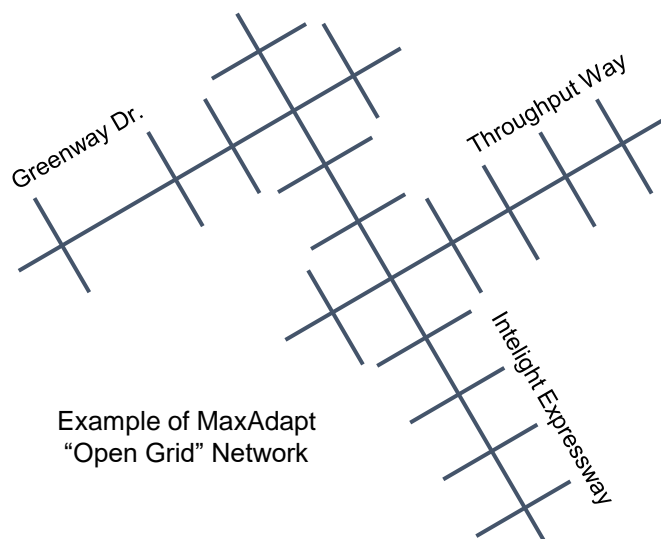
- Peer-to-peer communications between controllers
- No system/master field processor
- Onboard web server (edit database through web browser, no proprietary database editor)
- Monitor and modify configuration from Windows and Apple computers, IPADS, tablets, smart phones without special software
- Store and load hundreds of configuration databases on controller
- Easy, automated software updates via network or USB flash drive while intersection continues to run traffic signal operations
- Writes optimized timings to MaxTime coordination pattern via NTCIP protocol

## Infrastructure Requirements

- Detection requirements (lane by lane)
  - Cycle/offset optimization – advanced detection on coordinated/mainline (300 to 600 feet from stop bar should be placed in advance of normal queueing)
  - Split optimization – stop bar detection on all approaches
  - Compatible with radar, video, inductance loop, magnetometer and various other detection technologies
- Hardware
  - Currently requires Intelight ATC with 1883 engine board or newer (NEMA or 2070) with ATC API
  - Currently requires Intelight's MaxTime signal control software
  - Ethernet communications via fiber, wireless, or Ethernet over copper between signal controllers

## Theory of Operation

- Cycle/offset optimization
  - Based on 1/10th second high resolution data: cycle-by-cycle optimization of vehicle capture rates based on detector calls and coordinated window
  - User-defined calculation period, cycle length optimization range, percent improvement required to change
  - Calculates and protects minimum corridor cycle time from MaxTime databases (optional pedestrian protection)
  - Every controller optimizes the corridor and results are synced via peer-to-peer (distributive processing) – no master or lead controller in network
- Split optimization
  - Balances splits using approach/stop bar occupancy at local intersection
  - Uses combination of green occupancy ( $OCC_{GRN}$ ) and detector occupancy during first five seconds of phase movement red ( $ROCC_{5-sec.}$ )
  - Balances across rings and barrier groups
  - Incremental adjustments made on a sliding scale



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