Public Transportation optimization

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Project name	Public transportation optimization
Team ID	Proj_220532_Team_1

Abstract

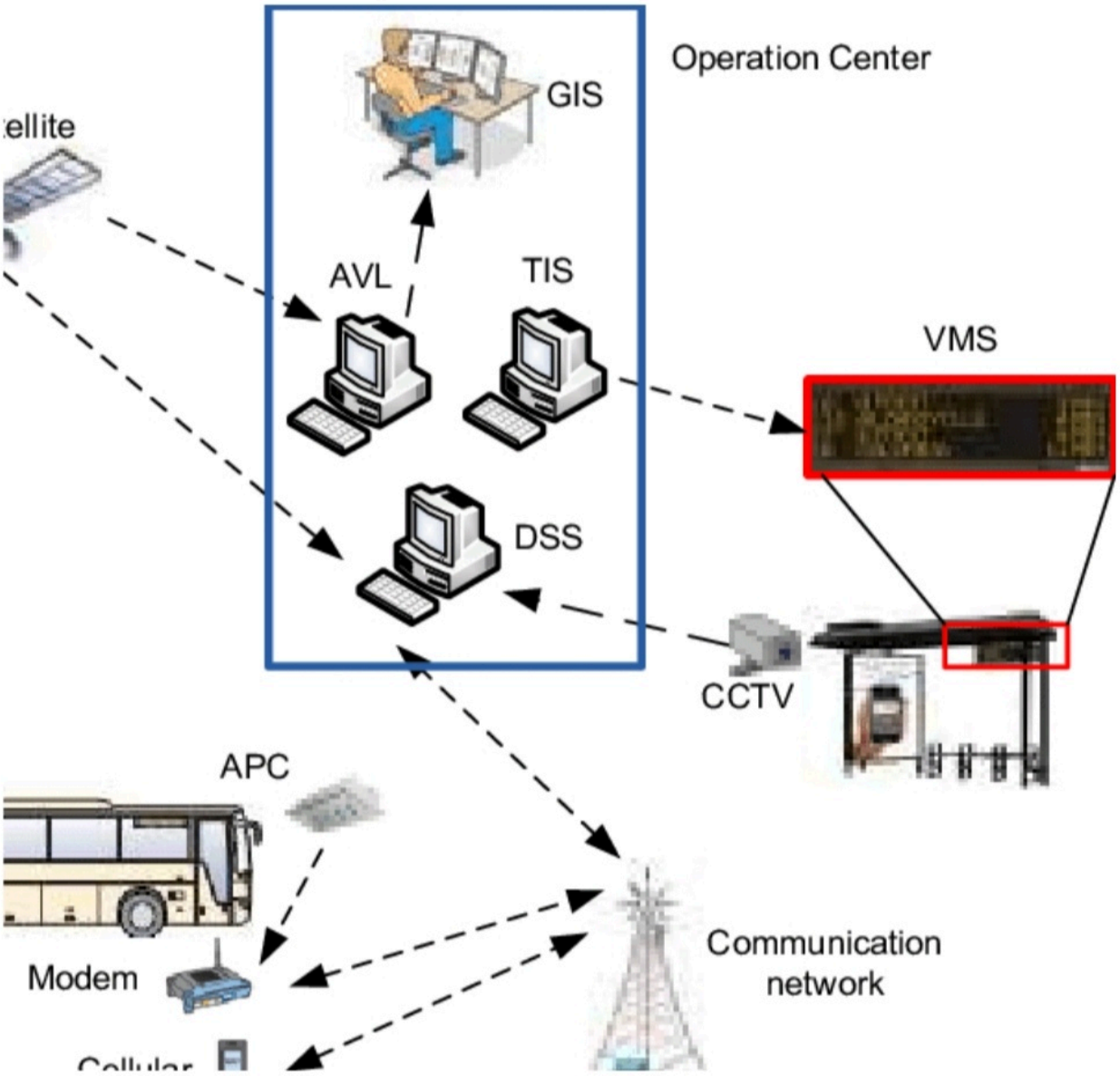
„The timetable is the essence of the service offered by any provider of public transport.“ (Jonothan Tyler, CASPT 2006)

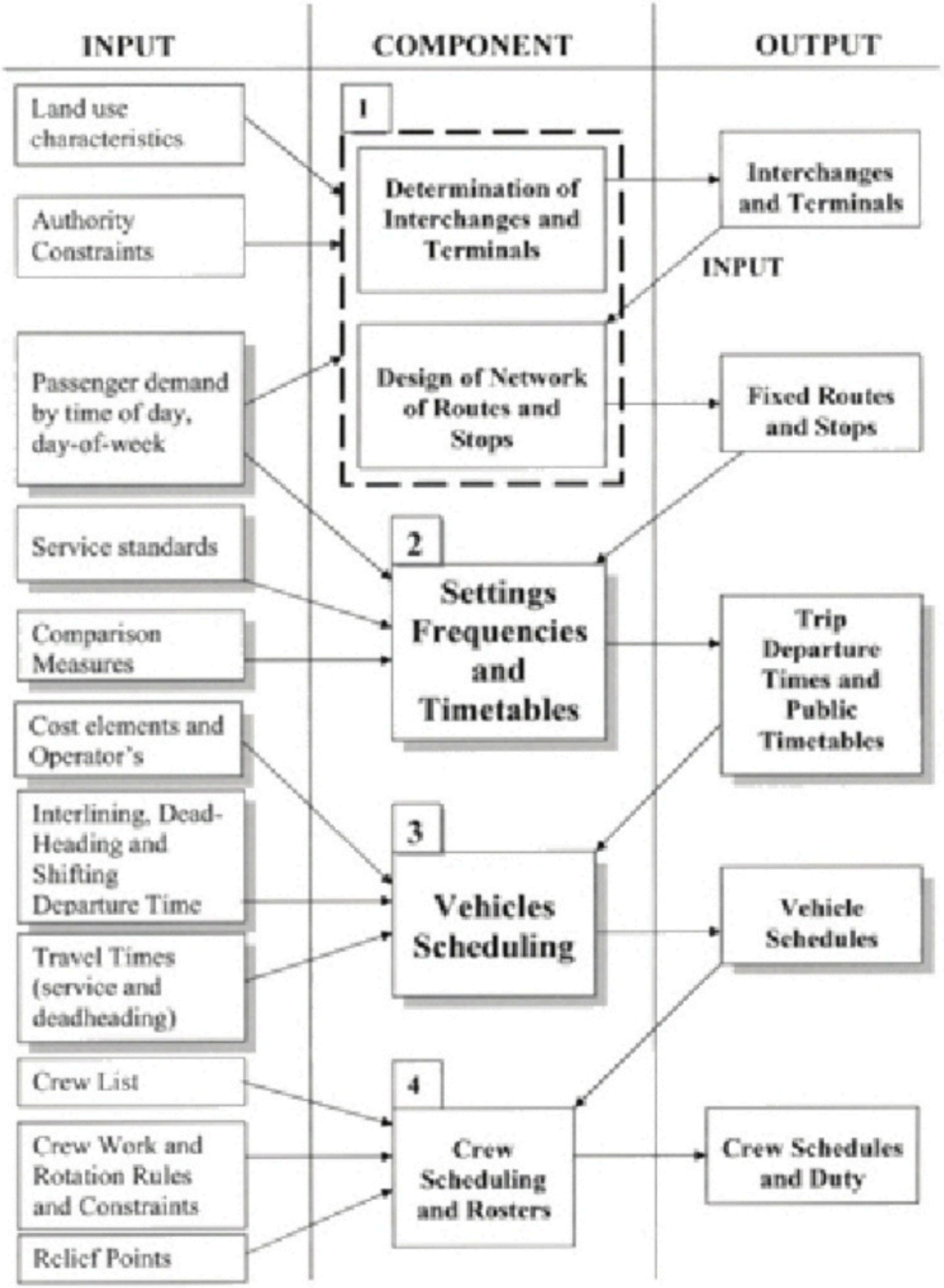
INTRODUCTION :

With more and more Internet of Things (IoT) devices entering the market daily, it's getting easier and easier to capture interesting data from the sensors and control systems involved with running a modern city. Low Energy Bluetooth (LEB) devices, GPS, near-field communication, mobile apps, streaming apps — data comes from everywhere today, and cities are generating data at a rapidly increasing rate. *Smart* cities use this data to enhance the quality of life for their citizens, and there's no better example than when you apply a "smart city" mindset to public transportation systems.

Finally, smarter transportation can reduce environmental impact. The EPA has found that investing in public transport and other types of transportation can lower greenhouse gas emissions. Considering that in 2017 the transportation sector represented the largest source of emissions from fossil fuel combustion, this is a significant win.

DIAGRAM:




INPUT
COMPONENT
OUTPUT
Land use characteristics
Authority Constraints
Passenger demand by time of day, day-of-week
Service standards
Comparison Measures
Cost elements and Operator's
Interlining, Dead-Heading and Shifting Departure Time
Travel Times (service and deadheading)
Crew List
Crew Work and Rotation Rules and Constraints
Relief Points
1
Determination of Interchanges and Terminals
Design of Network of Routes and Stops
2
Settings Frequencies and Timetables
3
Vehicles Scheduling
4
Crew Scheduling and Rosters
Interchanges and Terminals
INPUT
Fixed Routes and Stops
Trip Departure Times and Public Timetables
Vehicle Schedules
Crew Schedules and Duty

TRANSPORTATION OPTIMIZATION is the process of analyzing shipments, rates and constraints to produce realistic load plans that reduce overall freight spend and gain efficiencies across entire transportation networks. Once actual freight rates, approved carriers, specified capacities, transit times and other available data are entered into the optimization platform, the software generates a realistic, executable load plan for the shipment. With this information in hand, shippers, 3PLs, and consultants can make better decisions, save

valuable resources, improve revenues and cut costs

The process can be used for orders from anywhere in the world—and from multiple customers, locations or vendors— and can be combined into multi-pick/drop movements, continuous move shipments, backhauls, and pooling scenarios. From consolidating loads to finding better routes to choosing more capable carriers, transportation optimization helps companies save both time and money.

For example, with Mojo Transportation Optimization, MercuryGate's optimization solution, users can: a Identify optimal mode, carrier, rate, and route.

- A Leverage strategies including freight consolidation, mode shifting, zone skipping, cross docking, pooling, continuous moves, multi-pick and multi-drop shipments a Simultaneously optimize inbound/outbound, including backhauls and reduce empty miles or loads a Optimize a combination of private fleet and common carriers What is Transportation Optimization?
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TRANSPORTATION OPTIMIZATION A WIDE SPECTRUM OF USE CASES

SOURCING :

A Evaluate and analyze carrier bids with simulation of actual shipment data, lanes and volumes.

PLANNING :

A Capacity PlanningAssess future needs of carriers.

EXECUTION :

A Generate optimized load plans across inbound/ outbound, private fleet/ common carriers and consolidate across customers

SALES :

A Demonstrate ability to minimize cost with customers

A Evaluate new customer additions on existing route models

BENEFITS:

There are many different benefits that come from transportation optimization, including ROI that ranges from 1% to 30%, depending on the firm's current setup. A company that uses a combination of partial-truckload and less-than-truckload with few distribution points/manufacturing plans, for example, will see very big wins from their optimization efforts.

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A Tale of Two *Smart* Cities: One with Smart Public Transport, One Without:

Smart public transport may be the most important element of smart city planning because it affects *everyone*. All citizens and visitors need to get from one place to another, quickly and safely, and in today's densely populated cities that means public transport.

In cities with smart public transport, people waiting at a bus stop know their bus will be on time because they get alerts about estimated arrival times. They may or may *not* know that their city's department of transportation automatically deploys more buses when necessary, staggers arrival times to avoid "bus bunching," and keeps buses on the go by continuously analyzing sensor data and proactively fixing things *before* they take a bus out of service.

Event-Driven IoT

In keeping track of vehicles in-route and transit demand, many events occur per second. The timely processing of this information is critical to successfully operating a smart city transport service. In addition, any system downtime will result in significant loss of data — hindering your ability to operate at the capacity you need.

The most innovative smart cities are relying on event-driven architecture to solve these challenges. Event-driven architecture is designed to capture and distribute digital events, and it enables cities to better

respond to and capitalize on events *as* they happen, instead of *after* they happen.

With event-driven architecture, you're able to create a modular framework for your data to be processed in a stream, which will allow multiple organizations within your city to utilize data for their use case — from traffic lights to parking meters.

Instead of relying on polling, a network of event brokers – called an event mesh – can be used to publish data as it happens to the systems that subscribe to certain types (topics) of events.

Advantages of Public Transport

1. Public Transport leads to less air pollution as more people commute via single vehicle eliminating the need to travel by different modes.
2. In some areas, public transport is the only means to commute. It is the only facility for people to travel to different places. Hence, public transport is like a blessing for them.
3. Many people who cannot afford to buy their vehicles and cars generally travel by public transport. It is a very cost-effective mode of commuting for them.
4. Public transport is a very fuel-efficient mode of transport per capita or person; fuel consumption is less.

Disadvantages of Public Transport

1. The commute by public transport can be slower than by personal

vehicles. It has to cover stoppages, stands, and stations on the specific route.

2. As public transport vehicles don't stop at specific destinations, you must take care of your travel from the stand or station to reach your desired stop.
3. Privacy is a big issue in public transport. There are a lot of crowds, and sometimes you need more space to sit.
4. Public transport has a low level of comfort

CONCUSION:

Finally, studies have shown that public transportation reduces air pollution, which contributes to both short- and long-term health risks. Save your time! Public transportation is a great way to get around a city. It is a safe, inexpensive and eco-friendly way to commute