



CAMBRIDGE
SYSTEMATICS

Think  Forward

Advanced Model Features

Southeast Florida Regional Planning Model (SERPM v8.0)

presented to

MTF Model Advancement Committee

presented by

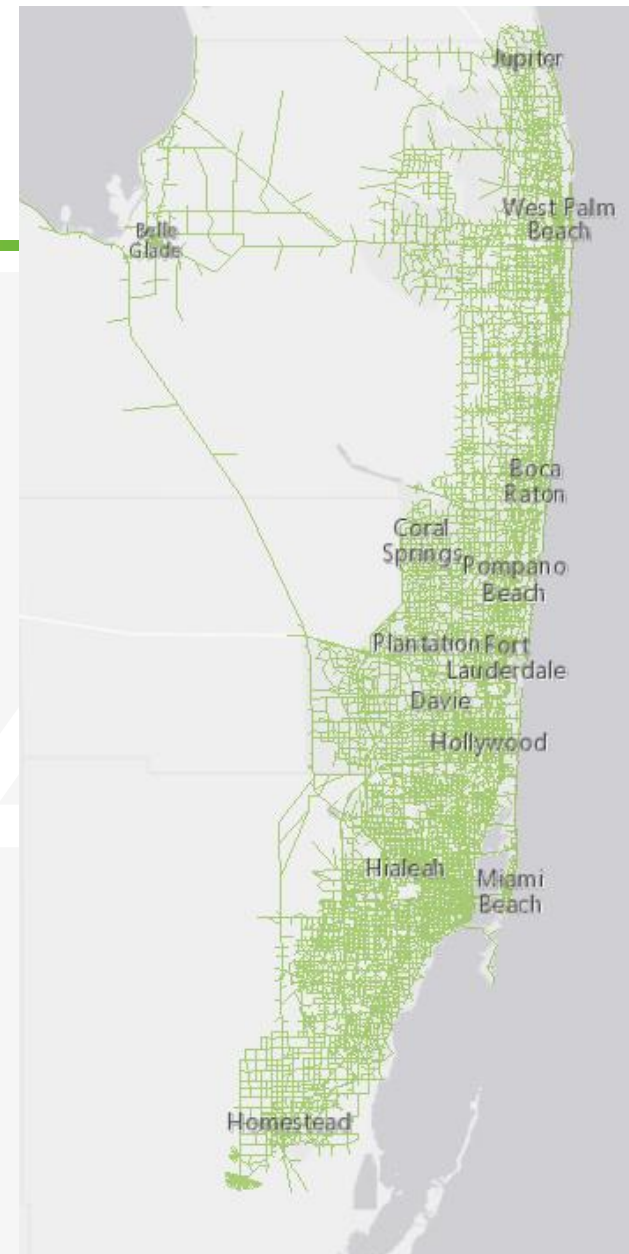
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SERPM Model Overview

- Current model: SERPM 7.0
 - » 2010 base / 2040 forecast
 - » Activity-based model for residents
 - » Tour-based model for visitors
 - » Half-hour time periods (5AM – 12AM)
 - » 5 Highway assignment Time periods
 - Auto occupancy; Pay / No Pay / HOV
 - » 4 Transit assignment time periods
 - Access mode
- Represents 3 counties
 - » 2.1M households and 5.5M persons
- SERPM 8.0 Model Update
 - » New HH survey and Streetlight data
 - » 2015 Base / 2045 Forecast



Future Mobility Scenario Testing

Identified Potential Scenarios for Modeling the Travel Behavior Impact of:

- Changing demographics
- Emerging technologies

Focused on How to Model in SERPM 7 ABM Environment

Six Scenarios

- Scenario 1 – Millennials Behave Differently
- Scenario 2 – New Transportation Services Reduce Need for Driving
- Scenario 3 – Emerging Technologies Enhance Transit Systems
- Scenario 4 – Managed Lanes Used Differently
- Scenario 5 – AV Technology Affects How People Travel
- Scenario 6 - Combined

Implementation approach

- *Where available*: pivot off of existing model parameters or extend existing structures
- *Where not available*: introduce new terms and calibrate the model to reproduce scenario shares
- Make changes incrementally – examine results of demand and supply models

Scenario 5 – AV Technology

Driving Alone Available to Unlicensed Individuals

- Model assumes all individuals 16 or older can drive alone
- Relax assumption to 11 or older

AVs Use Facilities More Efficiently

- Freeway facility types – increase capacity by 80-100%
- Other facility types – increase capacity by 10-30%

Less Onerous In-Vehicle Travel Time

- Tour mode choice (all purposes and logsums)
- Reduce auto IVT coefficient by 5-10%

AVs Significantly Reduce the Need for Paid Parking

- Reduce parking costs by 20%
- Set maximum terminal time to 1 minute

AV Technology Modeling Wish List

Zero-Occupancy Vehicles

- Self-parking at remote site
- Vehicle repositioning as part of a ridesourcing-type service
- Vehicle repositioning to serve multiple family members

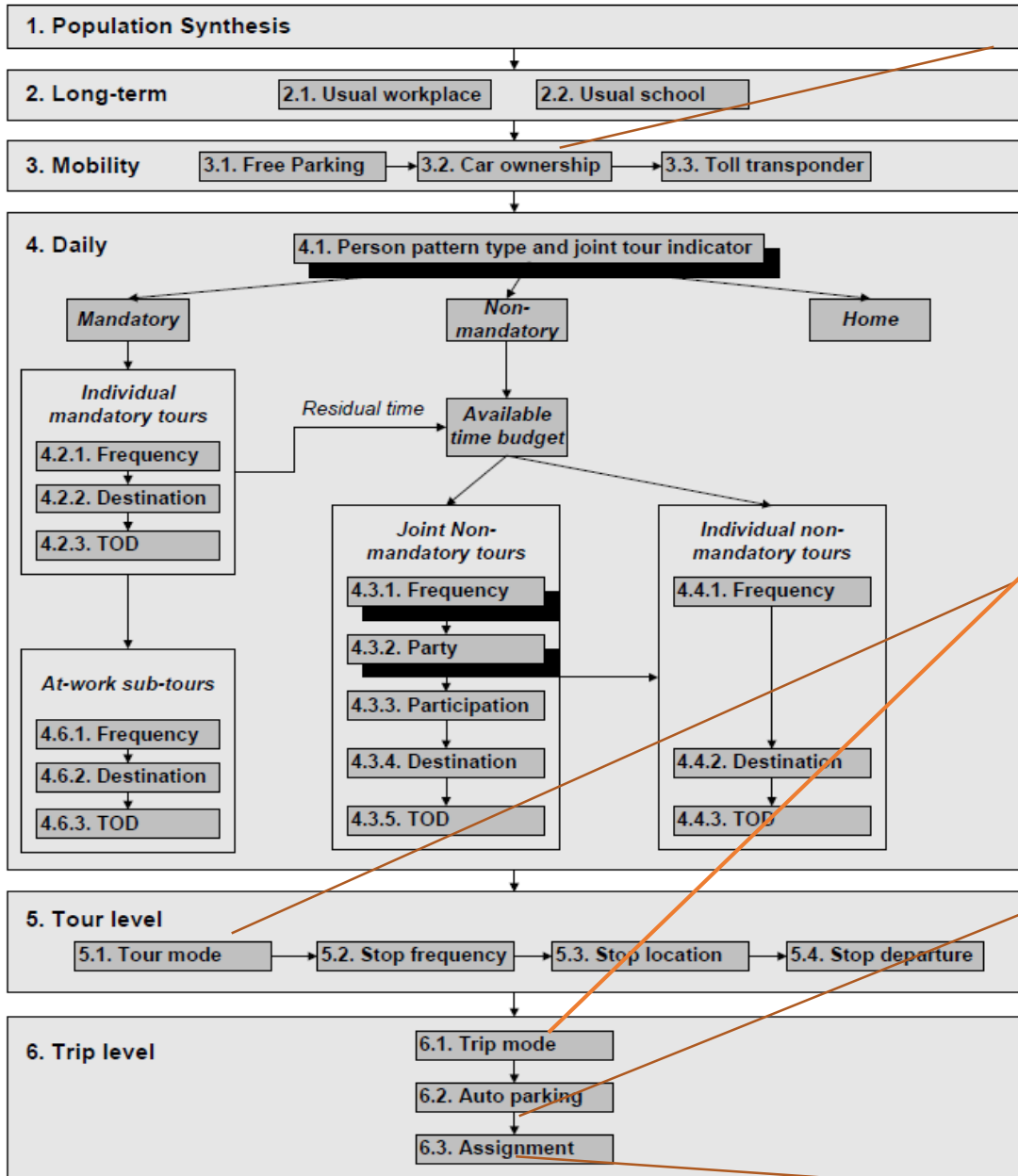
Mix of AV Technologies

- Extend Auto Availability to support type of vehicle
- Interaction of vehicles with varying technology

Enhanced Model Functionality – SERPM 8 model update

- Implement more substantial changes in model capabilities
- Approach:
 - » Build in functionality for exploratory analysis
 - » Parameters to be highly configurable
 - » Default operation would be with advanced features 'off'

Current ABM (SERPM 7.0) Flow Diagram



“Auto Availability”
Simulate Vehicle Technology

Restructure / Extend Mode
Choice

Generate ZOV trips

Segmented Assignment

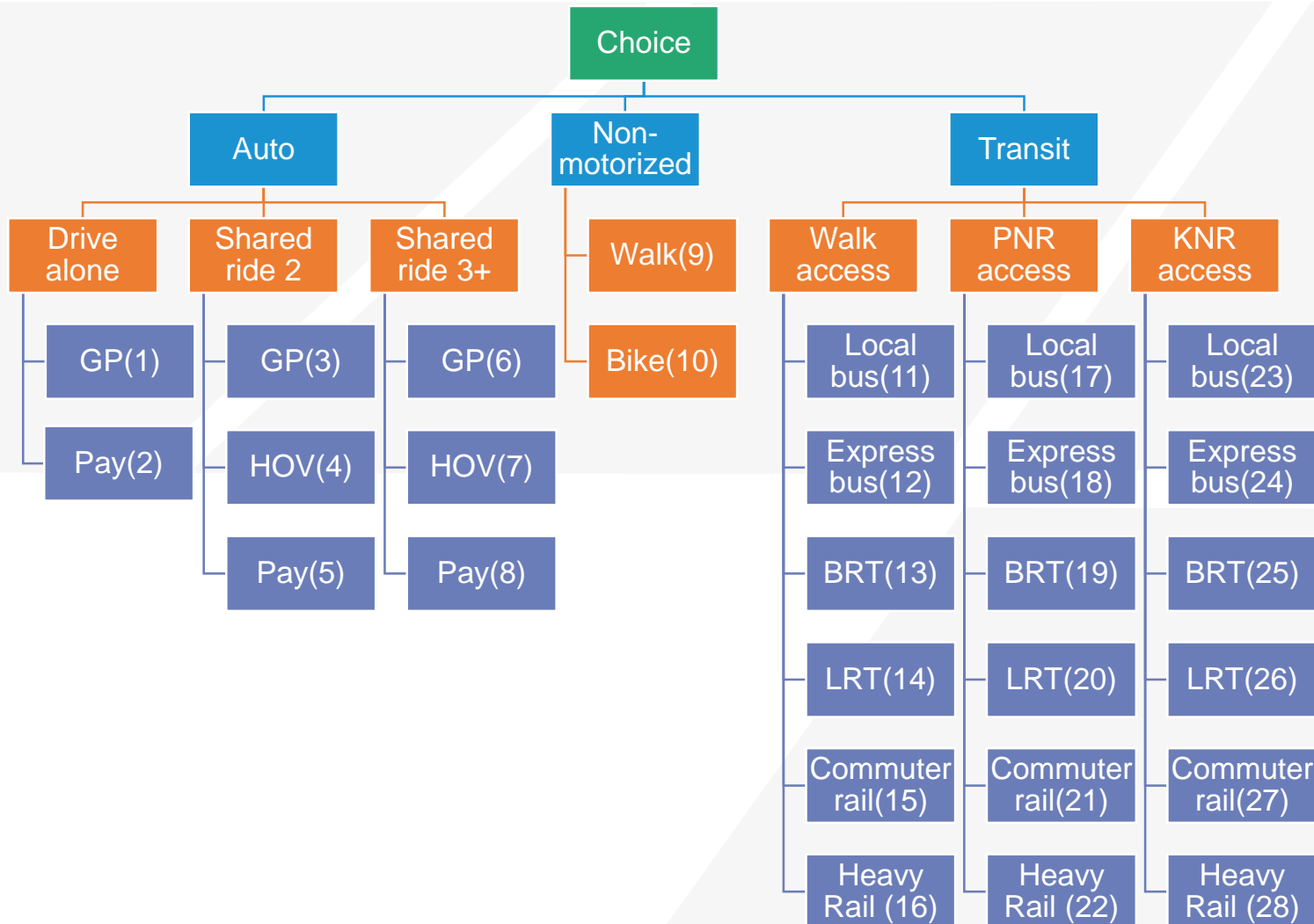
Auto Availability

- Simulate auto technology as an additional attribute
 - » Sequential choice to auto availability
- Consistent across all autos available in the household
- Model impact
 - » Restricted access facilities (C/AV-only lane)
 - » Potential for ZOV

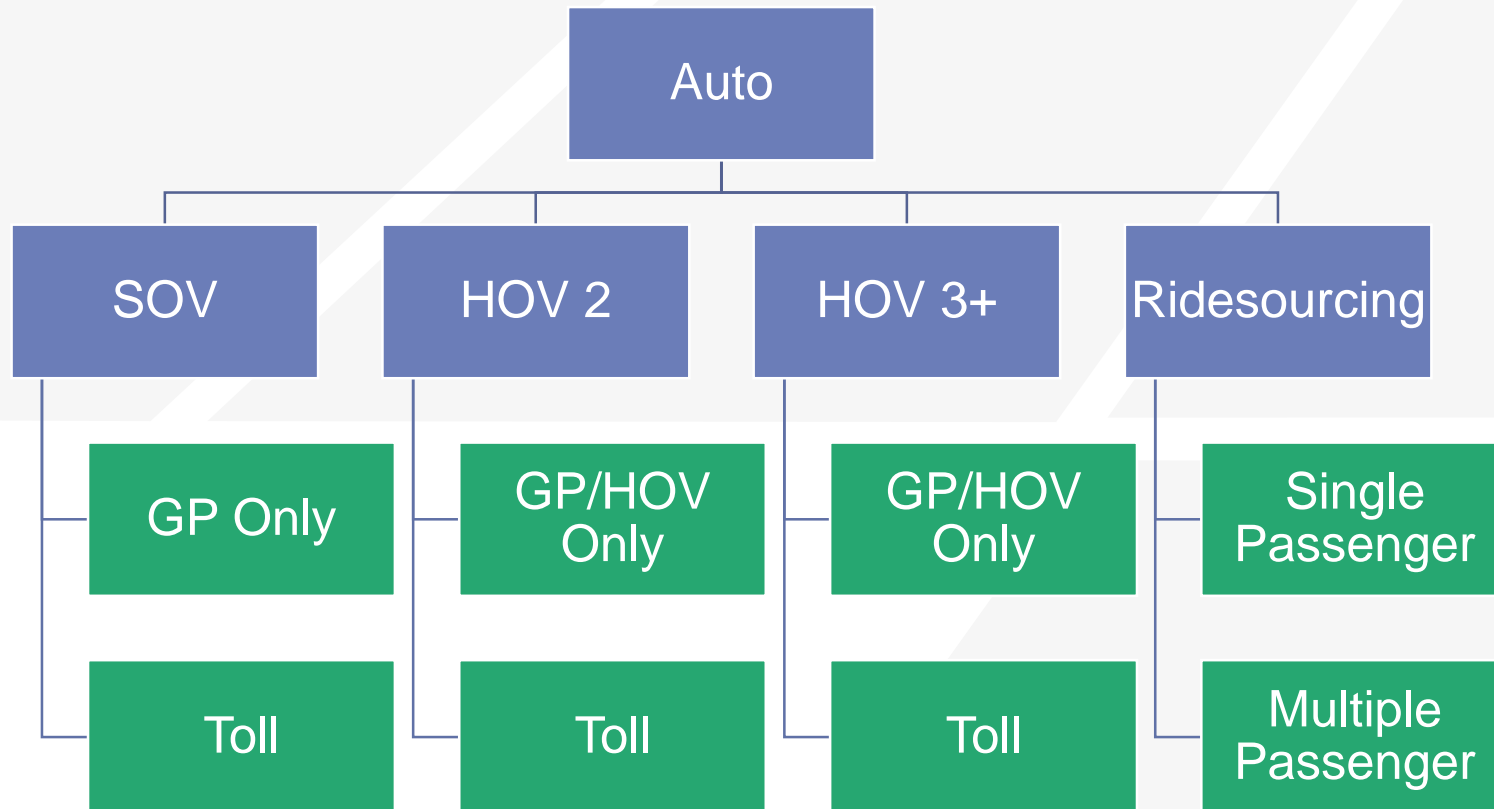
Willingness to Ridesource

- Availability of ridesourcing to household members
- Household characteristics
 - » Income
 - » Age ranges
 - » Auto availability
 - » Household / workplace area type
- Model impact
 - » Mode choice alternative availability

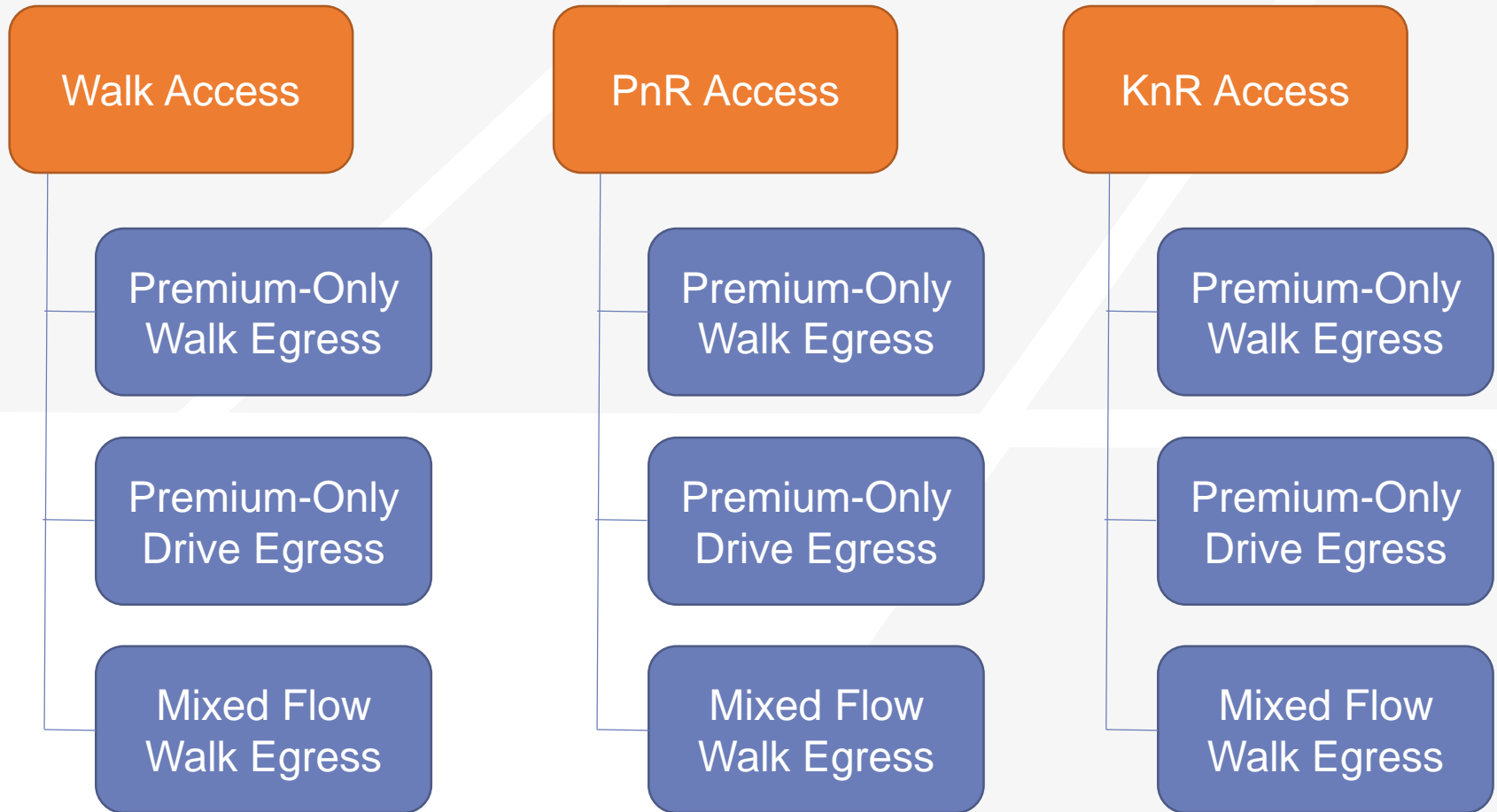
Current ABM (SERPM 7.0) Mode Choice Structure



Ridesourcing Alternatives



Transit Restructure



Zero-Occupancy Vehicles (ZOV)

➤ Potential:

- » Self-parking
- » Sharing amongst household members
- » Public shared services

➤ Post processing function

- » Leverage simulated person trip table
- » Self-parking by parking cost and density
- » Household member sharing induced ZOV trips
 - Household characteristics (multi-person household)
 - Vehicle technology
 - Travel patterns
- » Public shared services induced ZOV trips
 - Assumed fleet size
 - Density of trip end

Segmented Assignment

- Auto trip tables simplified:
 - » SOV / HOV; pay / no-pay
- Optionally segment by vehicle technology
 - » Facility restrictions: e.g., managed lane
 - » Explore penetration rate by roadway
 - » Effective capacity by vehicle technology (requires more research / experimentation)
 - Iterative process to modify capacity
 - Vary PCE by vehicle technology

Questions?

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