Reflections…

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CCC RISES
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Projects in Sustainability

- Transportation
- Work distribution
- Green computing
- Datacenter efficiencies
- Energy usage forecasting, tracking, controls
- Tools for others
Efficiencies with Scale

Microsoft Exchange
On-premise vs. Cloud Comparison, CO2e per user

Microsoft Sharepoint
On-premise vs. Cloud Comparison, CO2e per user

Microsoft Dynamics CRM
On-premise vs. Cloud Comparison, CO2e per user
Microsoft Commuting Workload

~175,000 people

~55,000 in Puget Sound Region
Promise of Efficiency & Conservation

- Copenhagen meeting
- Emissions abatement → 450 ppm by 2030 (~2°).

(source: IEA 10/09)
Matching algorithms: planned and instant
Incentives: mechanism design for truthful reporting
Collaboration & plans with related goals
Preferences and comfort: social component
Daily workflow: Outlook/Exchange

Coordination with King County Metro, WashDOT, MS Facilities, MS Sustainability.

GPS data: AM/PM commutes to & from Microsoft

With E. Kamar
Balancing Diverse & Changing Needs

Cost-benefit
- Earlier departure
- Delayed arrival
- Increased travel
- Savings on effort
- Fuel, environment

Shared & divergent preferences
Balancing Diverse & Changing Needs

Cost-benefit
- Earlier departure
- Delayed arrival
- Increased travel
- Savings on effort
- Fuel, environment

Shared & divergent preferences
Assignments based on observed trips.

Cost-benefit
- Departure change
- Delayed arrival
- Increased travel
- Savings on effort, fuel, environment
Ideal Coalescence

ΔKm  
56.89 km reduction

ΔMinutes  
+ $7
15.17 mins extra driving
42.58 mins delay

Cognitive Cost  
- $1.76
3 drivers less

Net Utility  
+ $3
+ $8.24

ΔCO2  
3.99 tons reduction per year
Results

Normal commute

Computed rideshares
Computation Models and Insights
"What If?" Studies

Number of agents

- Efficiency on number of commutes
- Efficiency on total cost

Number of participants
Computation Models and Insights
"What If?" Studies

Fuel Cost ➔
Computational Models and Design
Best Park & Ride Locations?
Acceptance and Trust

Challenge: Understanding acceptance, perceptions, social considerations

- Address concerns, leverage opportunities
- Trusted organizations
- Referral, reputation
  - e.g., existing online social networks (e.g., link distance bounds)
Distances and Relationships
Computational Futures

- Autonomous vehicles? … Yes.
- *But*…preferences, incentives, optimization!
  - Direction: Public *microtransit*