UNIVERSITY OF TORONTO

Ben-Gurion University of the Negev
אוניברסיטת בן-גוריון בנגב

RE-DESIGNING PROCESS ARCHITECTURES

TOWARDS A FRAMEWORK OF DESIGN DIMENSIONS

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Context

- Complexity, dynamism, and unpredictability increases both in business and IT worlds
  - Business model & technological innovations
  - Interconnectedness among enterprises/systems
  - Ever-increasing stakeholder expectations
- Enterprises (+their systems) need to respond to
  - Changes in their business domains & requirements
  - Failures to achieve their objectives
  - Take advantage of opportunities
- Enterprises need to be adaptive & evolving

Business Process Architecture

- Previously – individual BP analysis/design
  - Too narrow to address the above challenges
  - E.g., only standalone BP optimization
- Need a BP Architecture (BPA) perspective
  - All BPs in an enterprise & their relationships
- Numerous Choices in BP Architectures
  - Types of relationships among BPs
  - Possible movements of functionality among processes, etc.

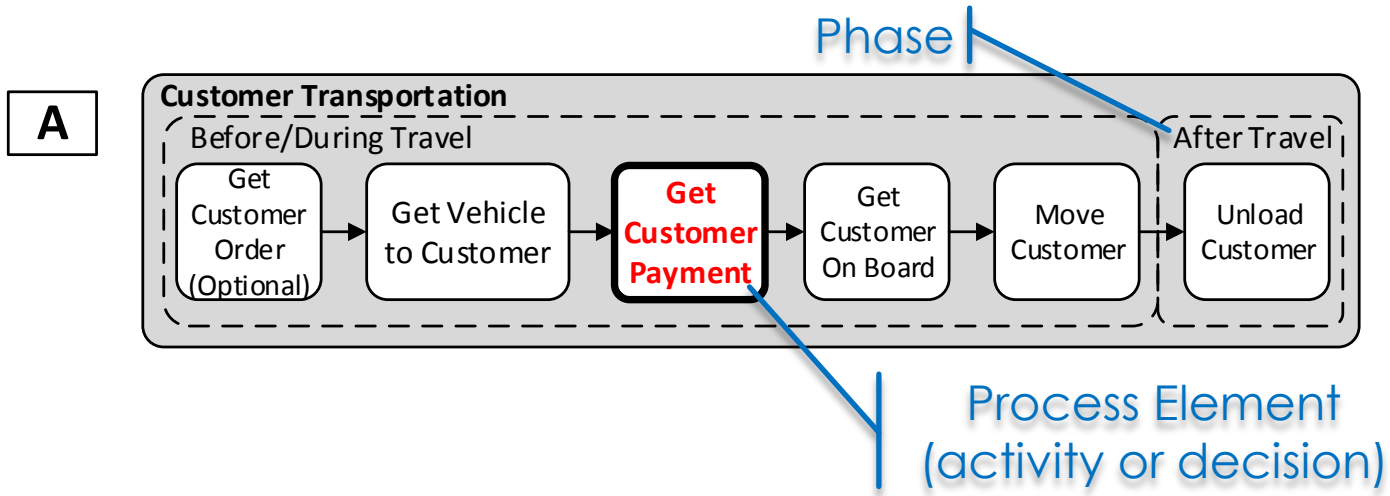
Features of the Approach

- Identify and Model relevant BP relationships
  - E.g., Temporal and Recurrence
- Integrate tool/capability and plan development in BPAs
- Propose four Dimensions of change in BPAs
  - Help navigate the space of **BPA alternatives**
- Identify and Analyze BPA alternatives
  - Represent and analyze Trade-offs (flexibility/agility vs. cost, efficiency, etc.)
  - Goal-driven approach, with explicitly captured quality objectives driving the evaluation

The Temporal Dimension

- Variations in placements of Process Elements (activities/decisions, PEs) in BPs
  - Different in non-functional characteristics
  - Employ *Phases* – groupings of PEs
- Postponement (vs. Advancement)
  - Potentially more data available
  - Positive: context-awareness, flexibility
  - Negative: cost, unpredictability, complexity

THE TEMPORAL DIMENSION EXAMPLE



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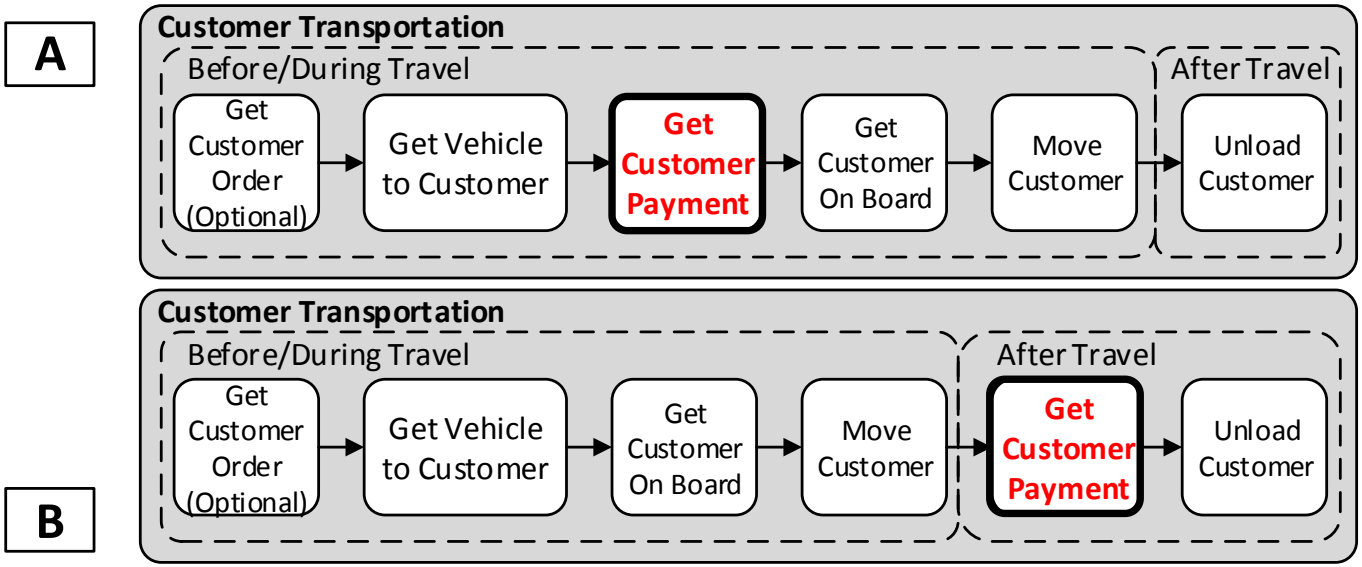

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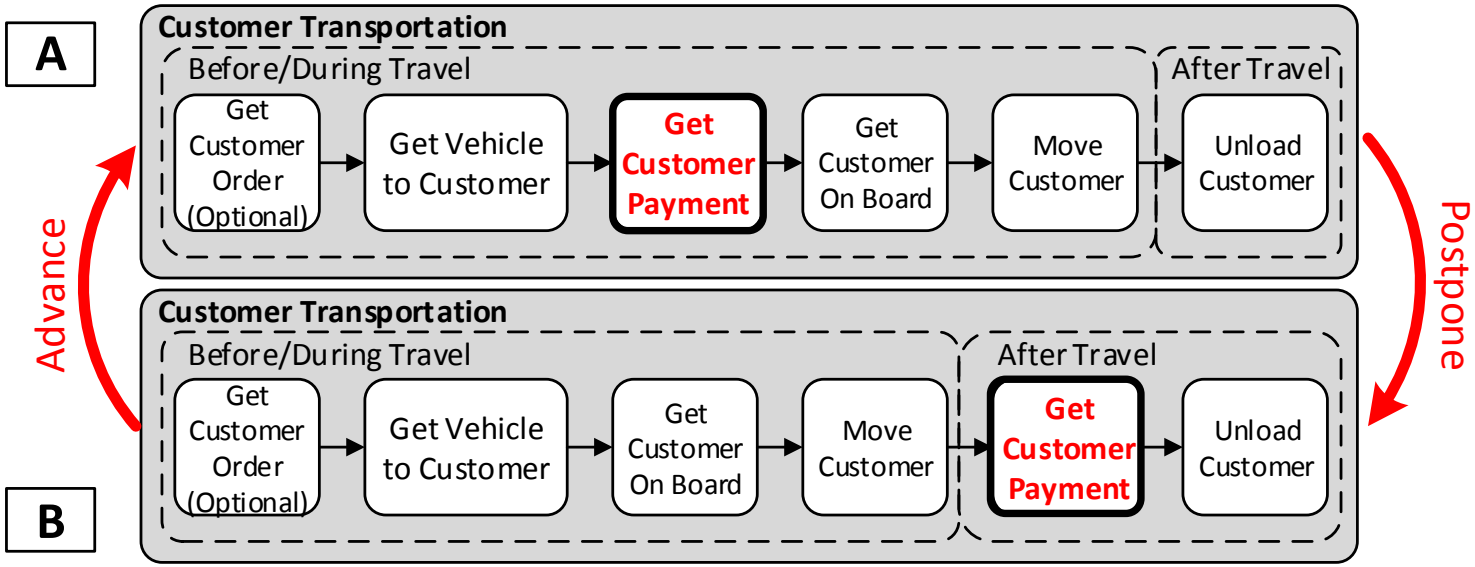

The Recurrence Dimension

- Relative frequencies of execution of *stages*
  - Stage – a process chunk with PEs with the same execution cycle; Stages contain phases
  - *For each execution of S1, N executions of S2*
- Increasing Recurrence
  - Makes use of contextual, instance-level info
  - Positive: flexibility, context-awareness
  - Negative: cost, reusability, predictability
- Opposite effects for decreasing recurrence

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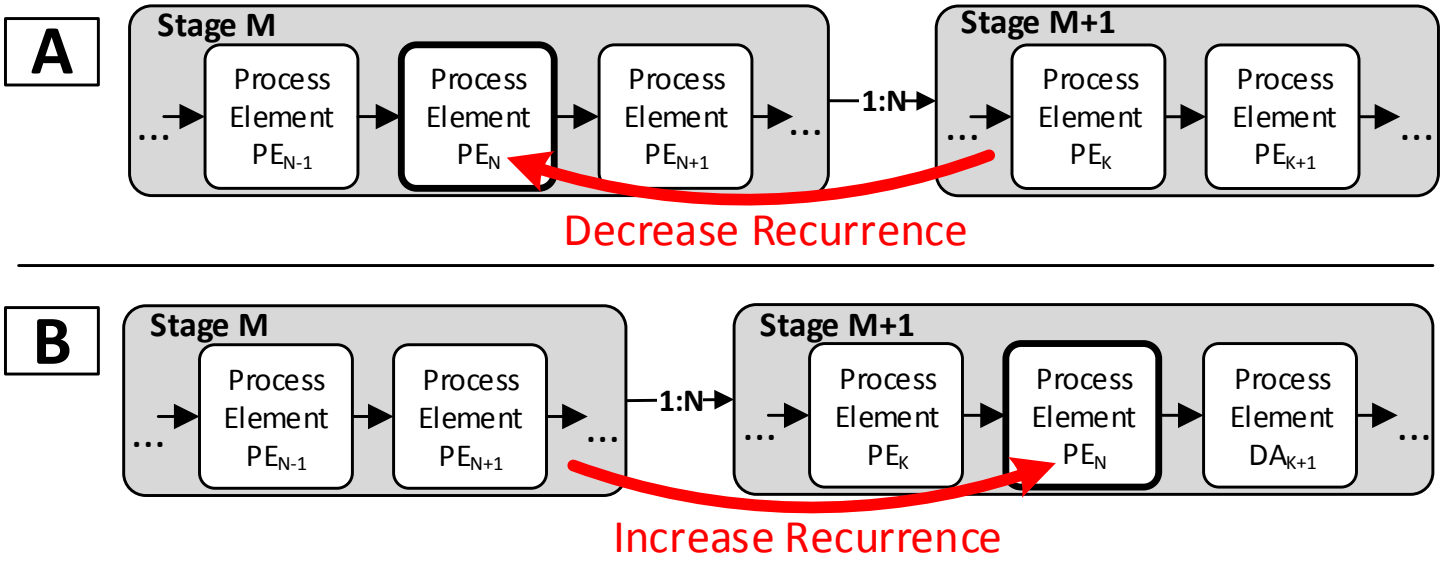

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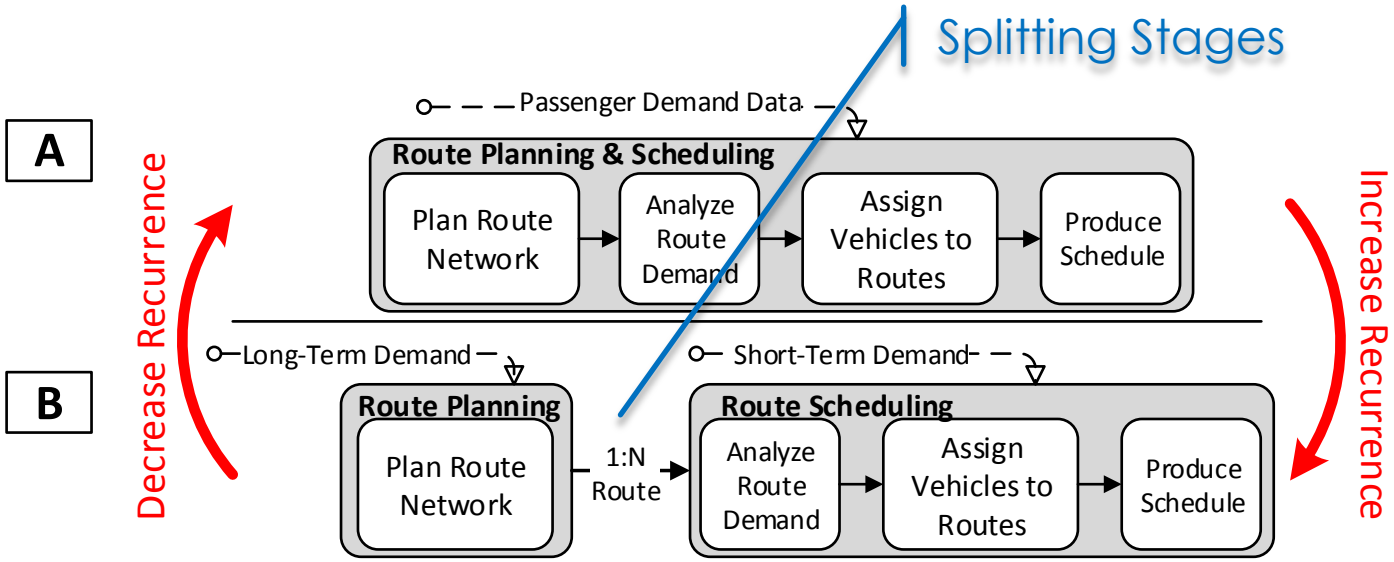
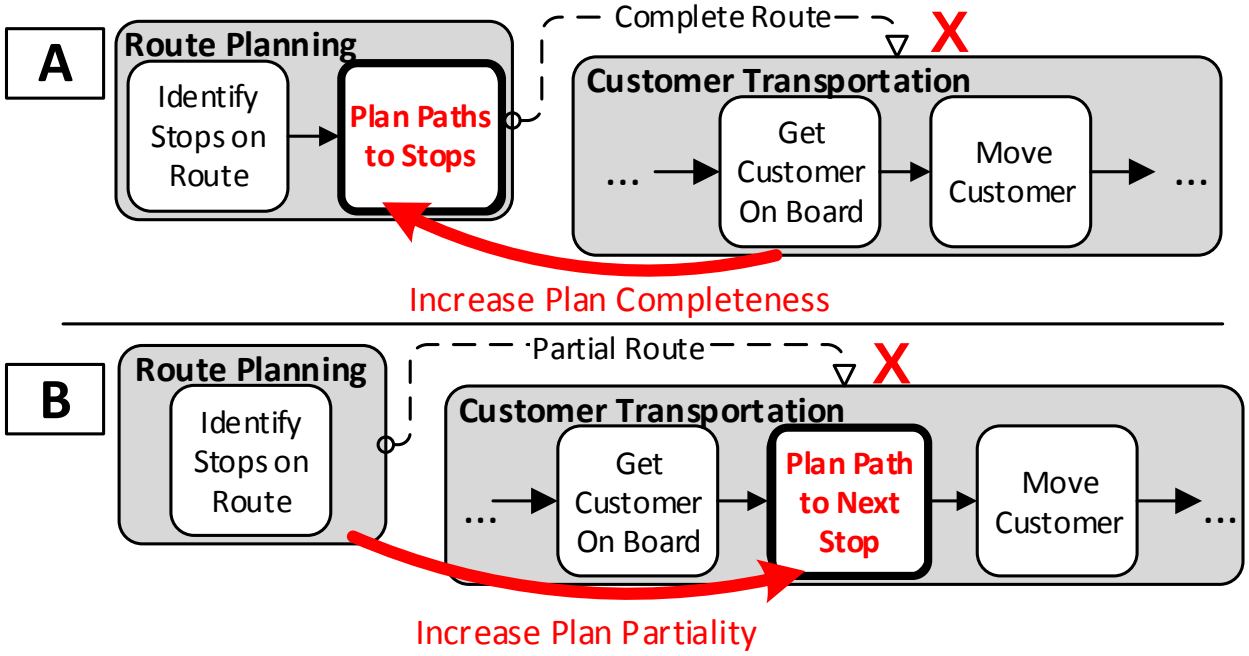


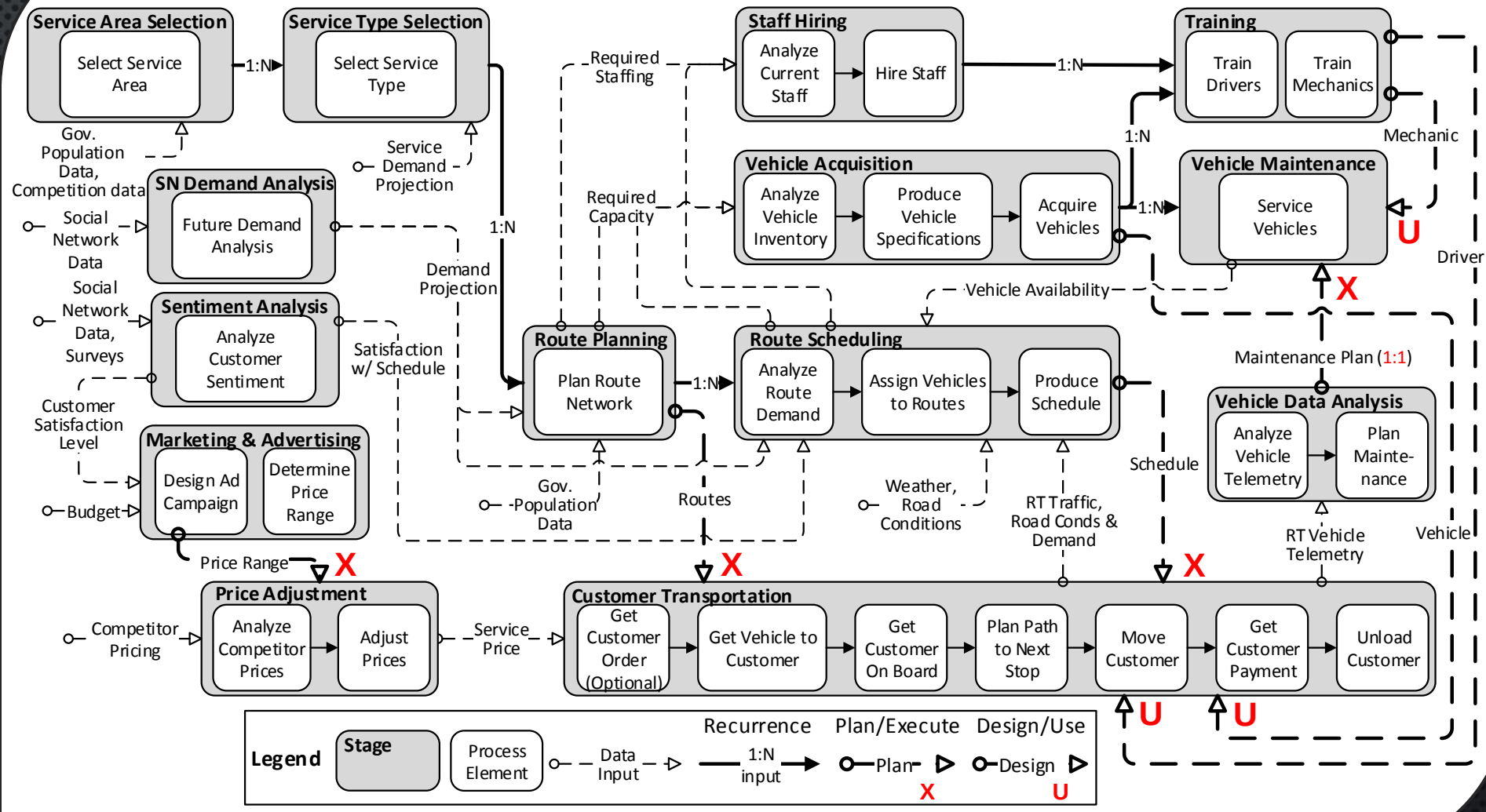
The Plan/Execute (P/E) and Design/Use (D/U) Dimensions

- For dynamic/evolving Orgs – Integration of planning & development into BPAs
  - P/E: Planning stages output Plans/Specs
  - D/U: Design Stages produce tools/capabilities
- Choices for a Process Element
  - P/E: Part of a plan or left to runtime
    - Concerns: Plan completeness/partiality, Flexibility
  - D/U: Built into a tool/capability or left out
    - Concern: Tool specialization vs. customizability

THE PLAN/EXECUTE DIMENSION EXAMPLE



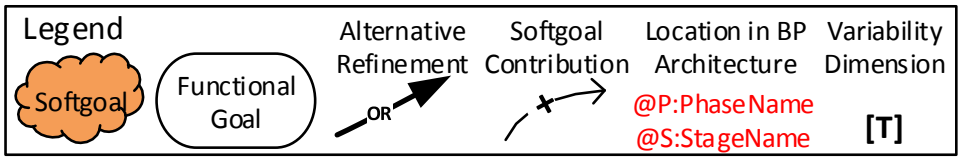
BPA FOR THE PUBLIC TRANSPORTATION CASE STUDY



Analyzing BPA alternatives

- For each set of PE placement alternatives
  - Use Goal Models to capture placement choices for the PE in the BPA
  - Use Non-Functional Requirements (NFRs) to capture selection criteria
  - Evaluate each alternative w.r.t. the NFRs
- To-Be BPA Configuration
  - Implements the selected variant

ANALYZING BPA ALTERNATIVES



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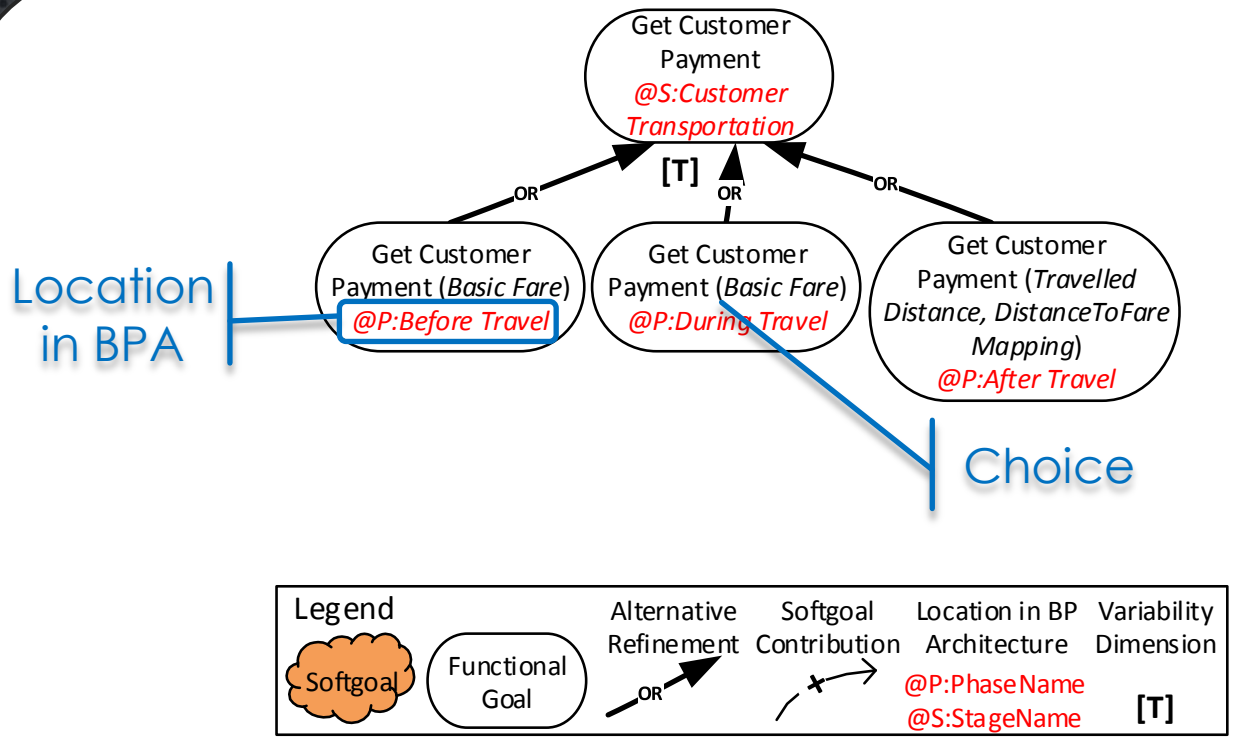

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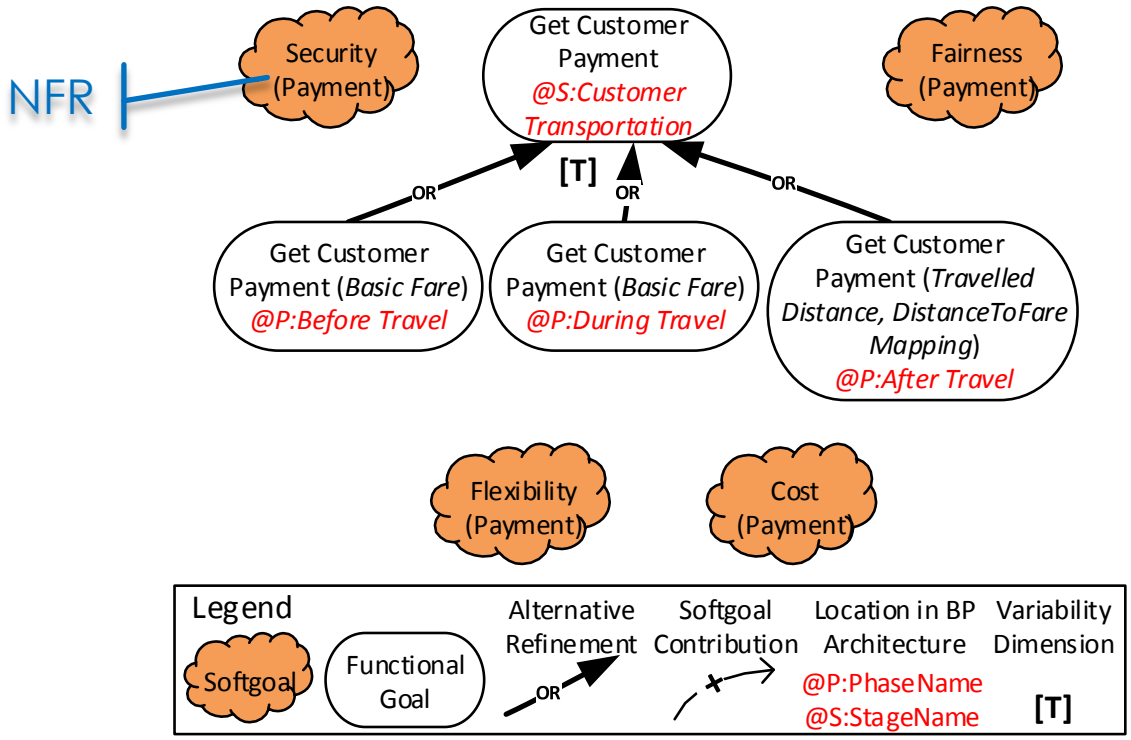

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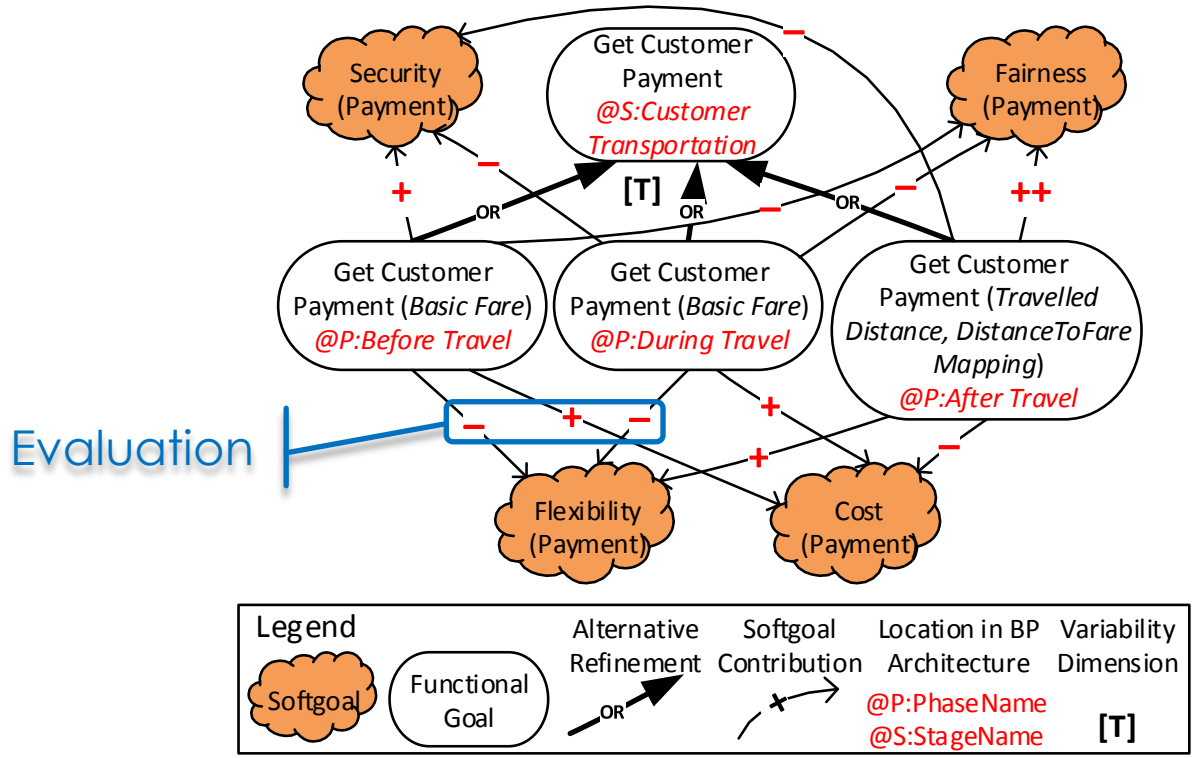

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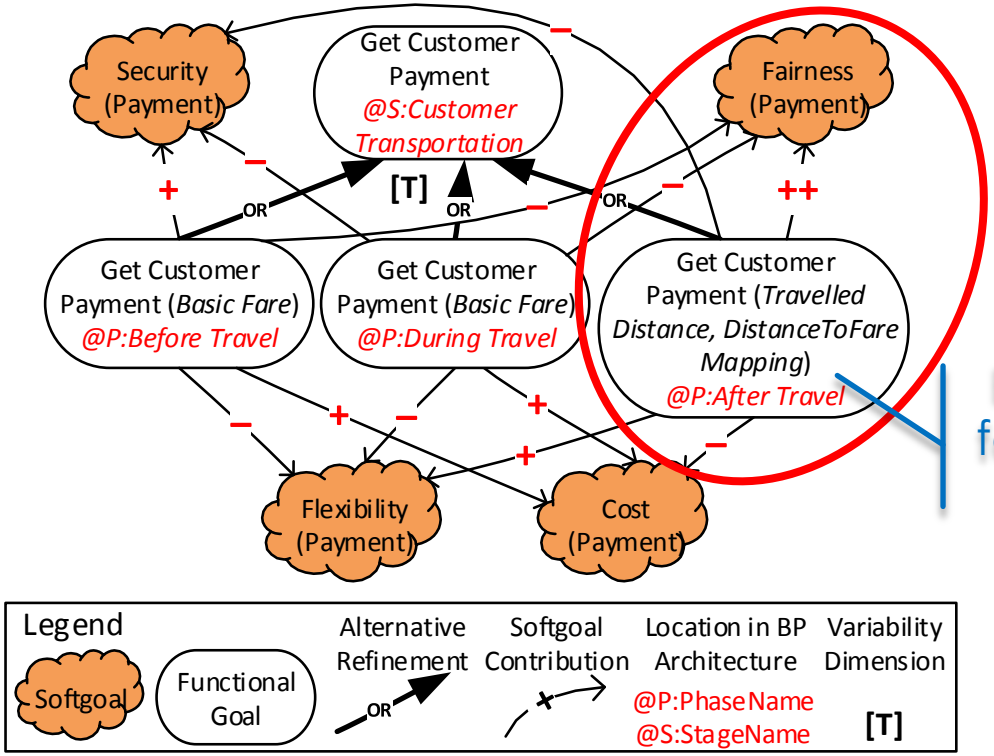

Conclusions and Future Work

- Presented an approach for
  - Identifying and analyzing BPA configurations
  - 4 dimensions to structure the space of options
  - Supporting both adaptation and evolution
- Future Work
  - Integration of multiple PE placement options
  - Thorough integration of data
  - Feedback loop integration

Thank You!

Questions?

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