

# An Approach to Systems and Infrastructure for Adaptive Survey Design At Census

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NOTE:

The material in this presentation represents the opinions  
of the authors and not the U.S. Census Bureau

# What Does it Take to be Adaptive?

- An organizational mandate
- An understanding of the elemental capabilities required
- An architectural approach

# Organizational Mandate

## Census Bureau Example

1. Established a Center with the primary responsibility for implementing Adaptive Design for the enterprise
2. Staffed the new Center for Adaptive Design (CAD) with motivated representatives from each Directorate (Decennial, Demographic, Economic, Information Technology)
3. Inserted Adaptive Design goals in key strategic documents
4. Insisted that the CAD be a combined effort of Statistical Methodology and IT Enterprise Architecture
5. Robert Groves and John Thompson

# Elemental Capabilities

Capability	Capability Overview
Augment Survey Frame Data	<ul style="list-style-type: none"><li>• Response data from other surveys</li><li>• Administrative Records</li><li>• Paradata</li><li>• Planning database</li><li>• Other frame repositories</li><li>• Ecological information found in block group or census tract-level statistics</li></ul>
Real-time Access to Response Data and Paradata	<ul style="list-style-type: none"><li>• To monitor and manage progress, cost and quality during data collection</li><li>• Drives automated, rule-based mode switching, or other interventions</li><li>• Feeds statistical modeling</li></ul>
Flexible Business Rule Execution (automated and manual)	<ul style="list-style-type: none"><li>• Written as a hierarchical or a linked set of conditional statements</li><li>• Provides greater flexibility and plug-and-play capabilities, eventually reducing the need for costly intervention from software programmers to make system updates</li></ul>

# Elemental Capabilities

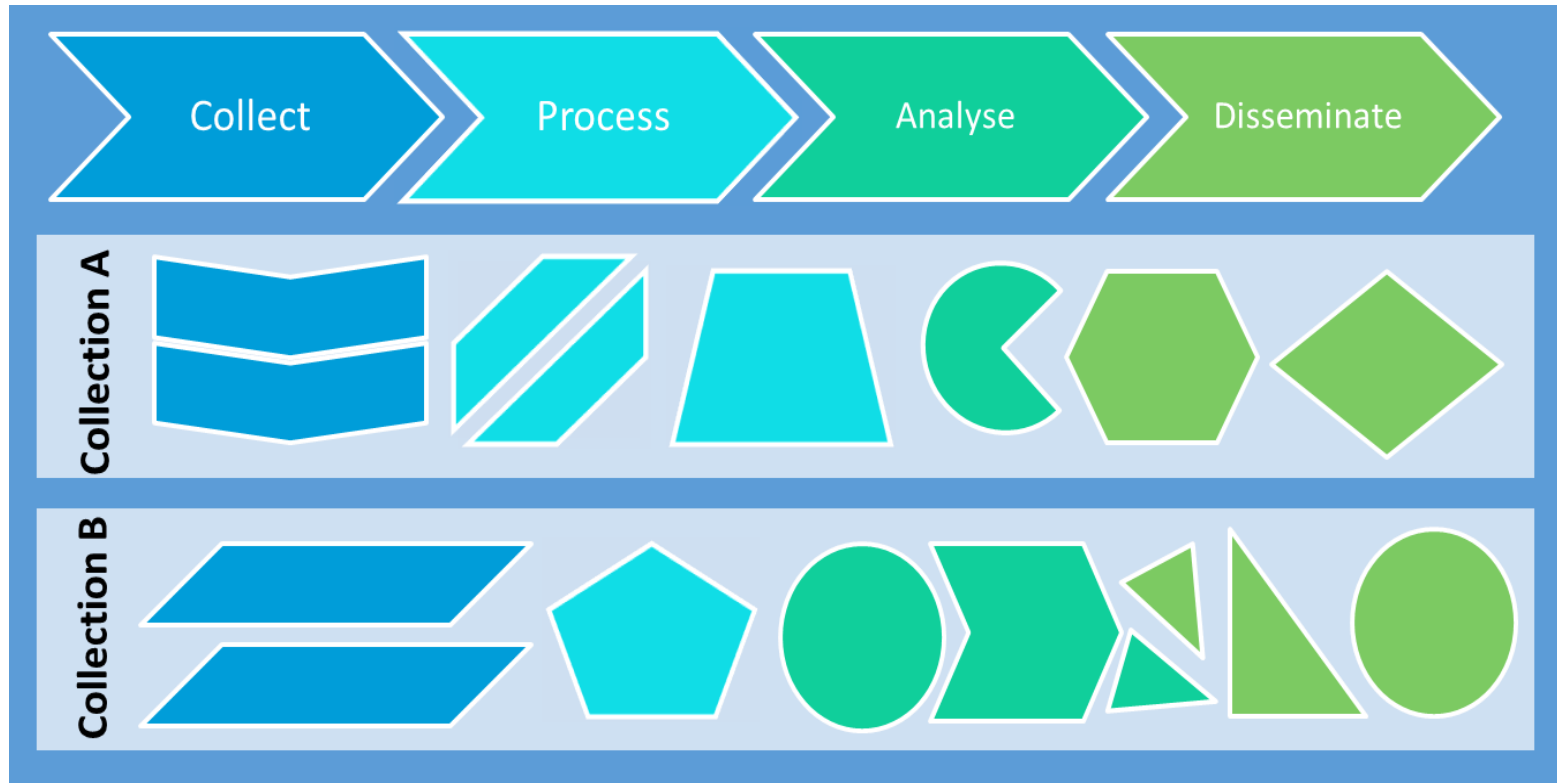
Capability	Capability Overview
Case Management Across Modes	<ul style="list-style-type: none"> <li>• Enables mode assignment and mode switching</li> <li>• Integrates all mode response data, paradata, and administrative record data</li> <li>• Provides the cost/quality trade-off hub</li> </ul>
Sub-sampling for Interventions	<ul style="list-style-type: none"> <li>• Leverages sub-sampling to focus resources on getting interviews with priority cases</li> <li>• Identifies, through frame and paradata, the outstanding cases that impact survey estimates.</li> </ul>
Daily Summary Level Estimation	<ul style="list-style-type: none"> <li>• Based on near real-time editing, automated coding and imputation during data collection</li> <li>• Informs data collection and stopping rules</li> </ul>
Interactive Dashboard and Reporting	<ul style="list-style-type: none"> <li>• Information on the number of active surveys, mode assignments, number of mode switches per survey, auto coding, imputation and estimation activities, number and frequency of business rule executions, etc.</li> </ul>

# Architectural Approach

- Work with Standards (common conceptual frameworks)
- Create a solution architecture
- Create a Program Roadmap

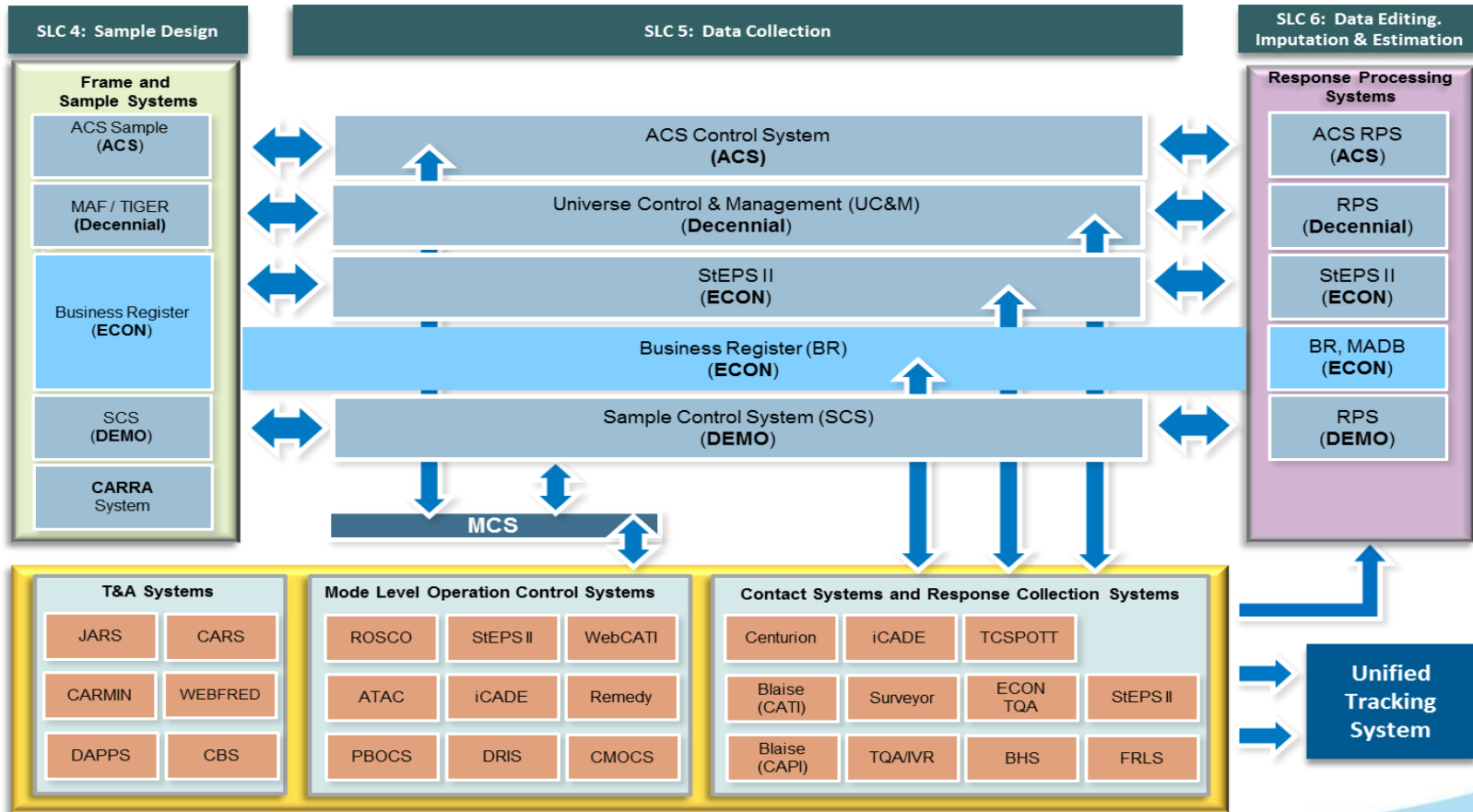
# Challenges

- Accidental Architecture<sup>1</sup>



# Challenges

- This is what Accidental Architecture looks like at Census:

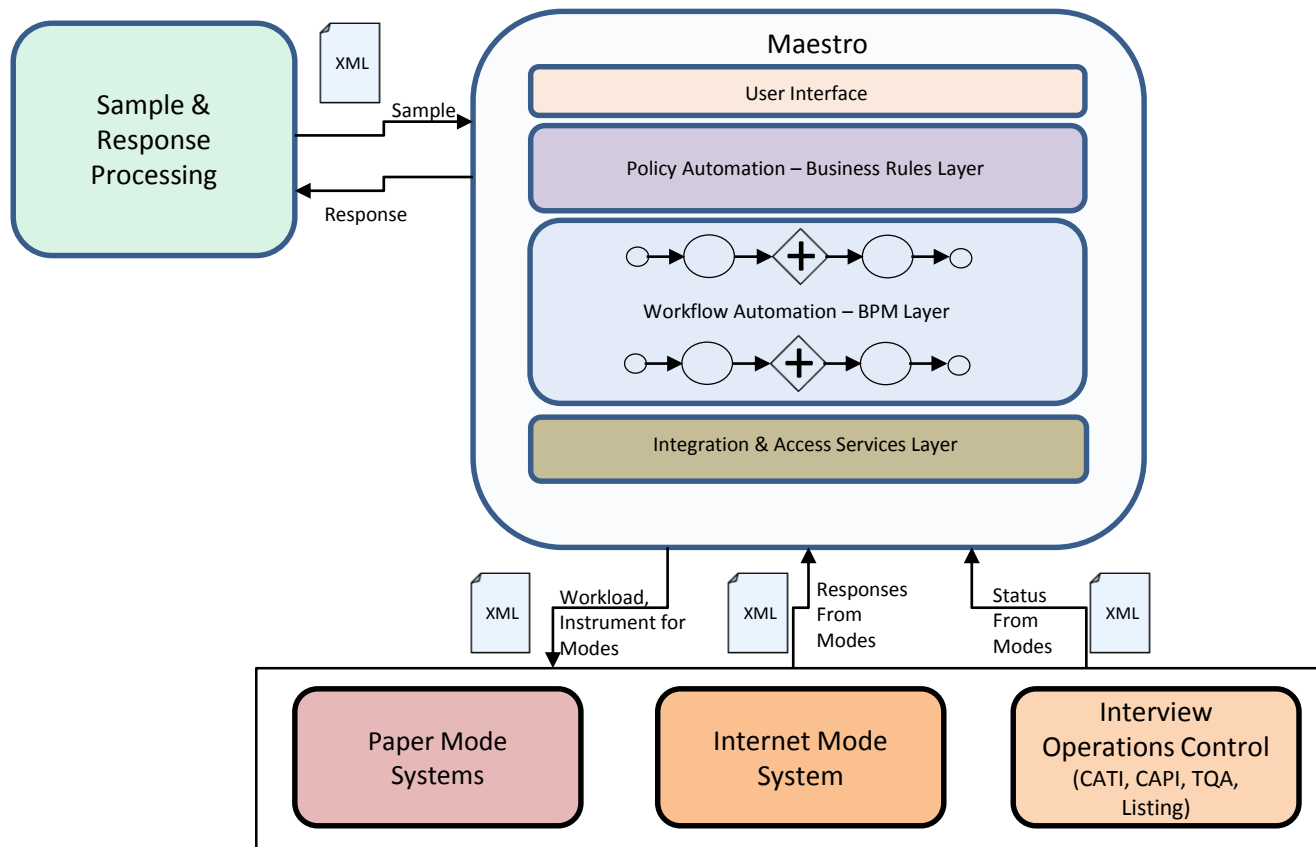




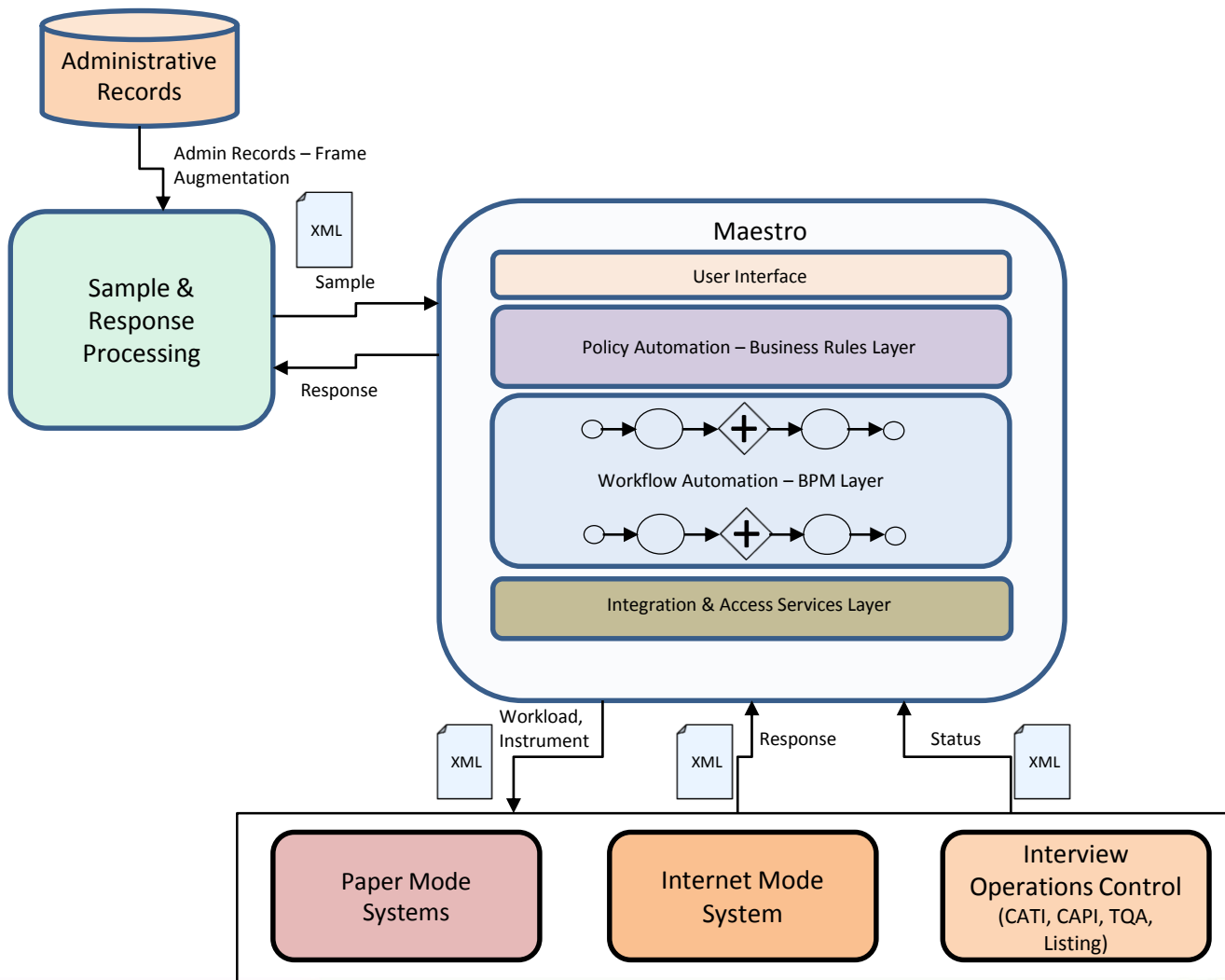
# What are Others Doing?

Stat Organization	New systems or Programs	Example Outcomes that Support Adaptive Design
RTI	General Survey System Initiative (GSSI), Nirvana, Adaptive Total Design (ATD)	Integrated and standard system that ties together all stages of data collection and processing; Data visualization enabling adaptive treatments
Statistics Netherlands	Structural Business Statistics (SBS); Short Term Statistics (STS)	Standard rule-based modules for production, Central linkage of key data sets
USDA National Agricultural Statistics Service (NASS)	The National Operations Center	Standardized survey data and metadata; Consolidated and generalized survey applications
Statistics New Zealand	Business model Transformation Strategy (BmTS); Stats 2020 Program	Fewer stand-alone systems ; Large-scale IT Platforms; greater reliance on statistical analysts, less on IT teams.; Standard tools and processes
Australian Bureau of Statistics	Information Management Transformation Program (IMTP); International Collaboration Efforts (ICE) and the DDI-SDMX Implementation Program (DSIP)	Metadata-driven systems based on agreed standards; One ABS data warehouse to store and manage data from all sources; On-line data that can be queried; Management of statistical workflows; International collaboration to build next generation statistical tools

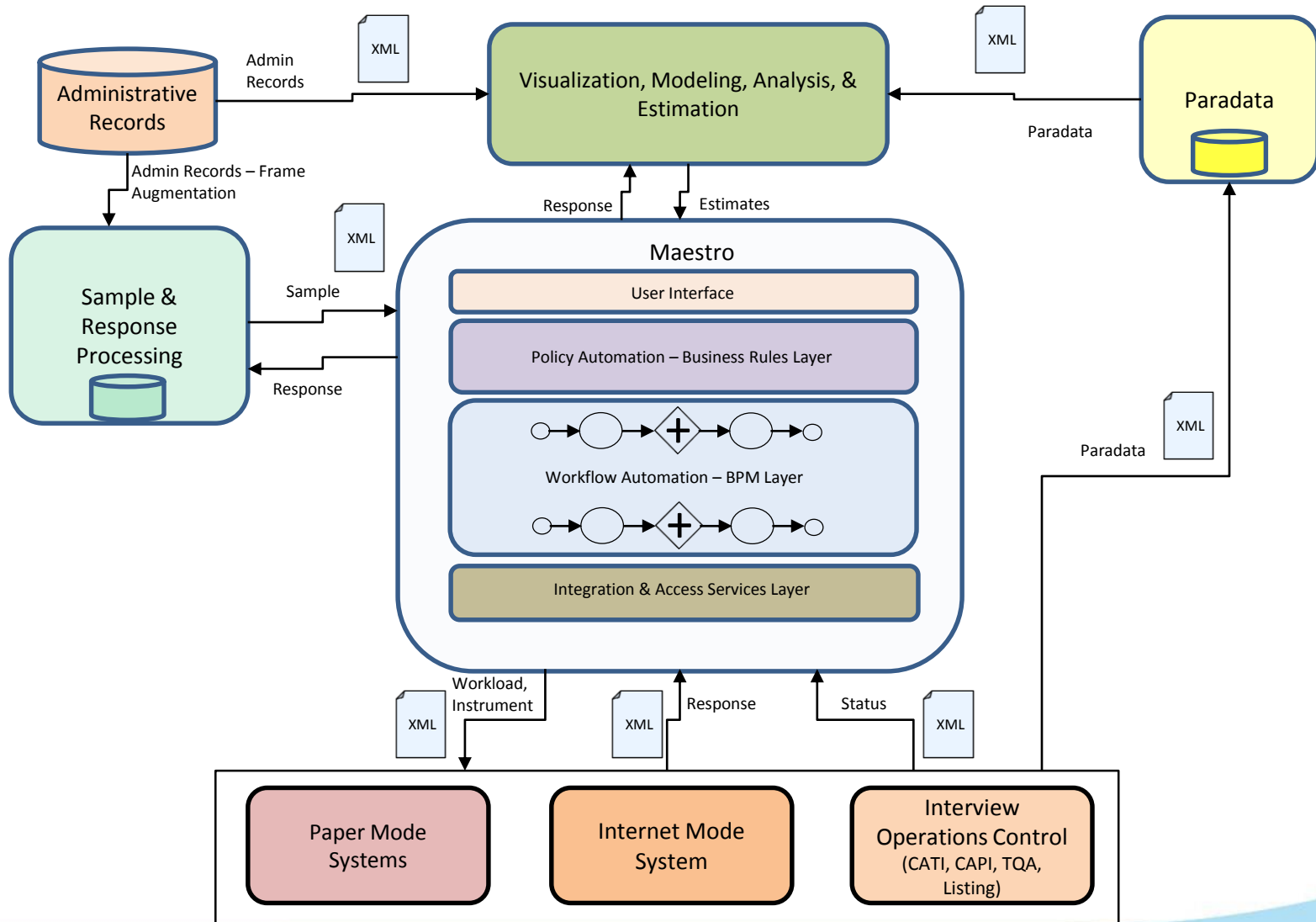
# Single Platform to Manage Multiple Data Collection Modes



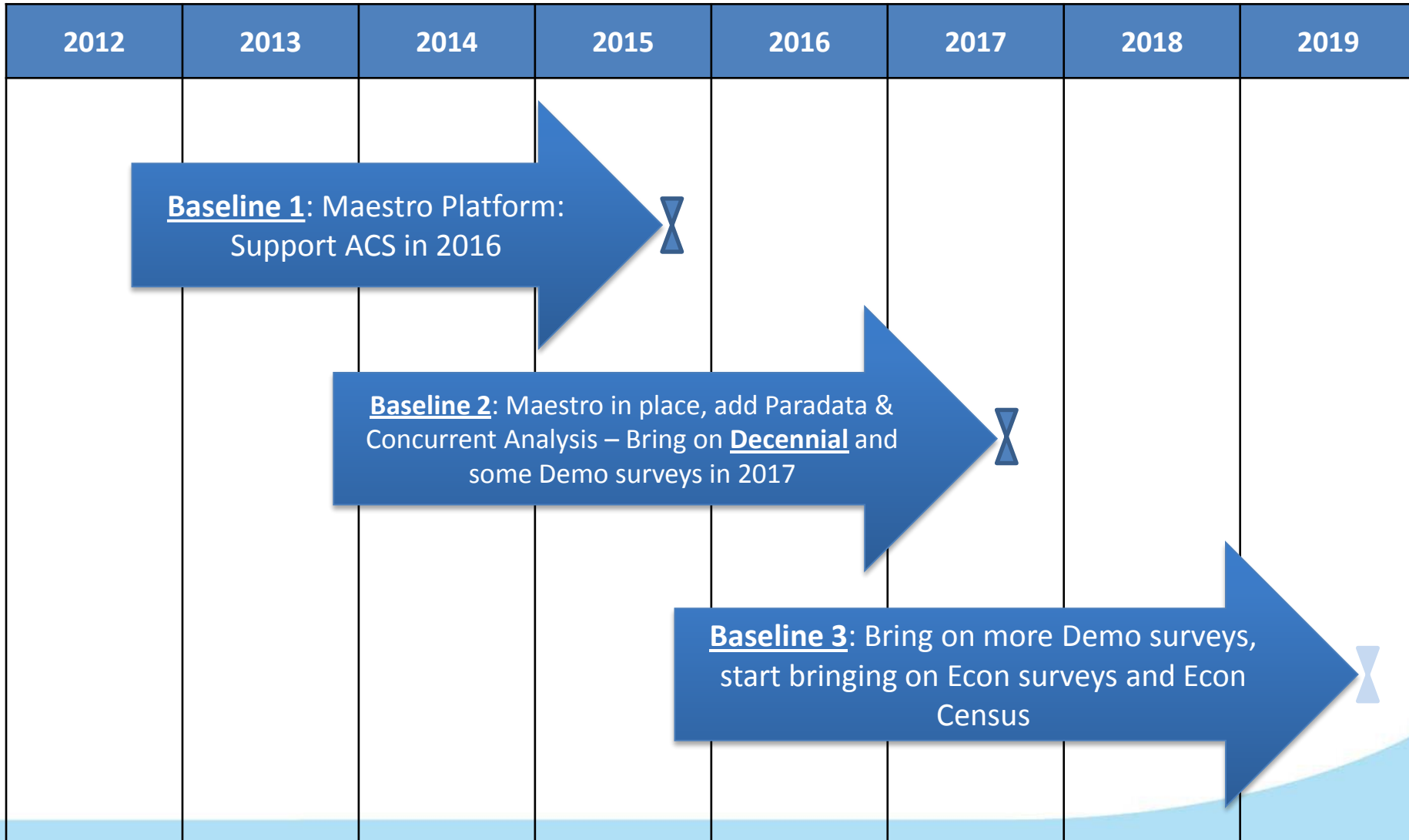
# Augment Frame Data



# Adaptive Orchestration of Data Collection



# Plan for Rolling Out Adaptive Design



# Contact Information

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