

Data Portal for Large Scale Service System Simulation



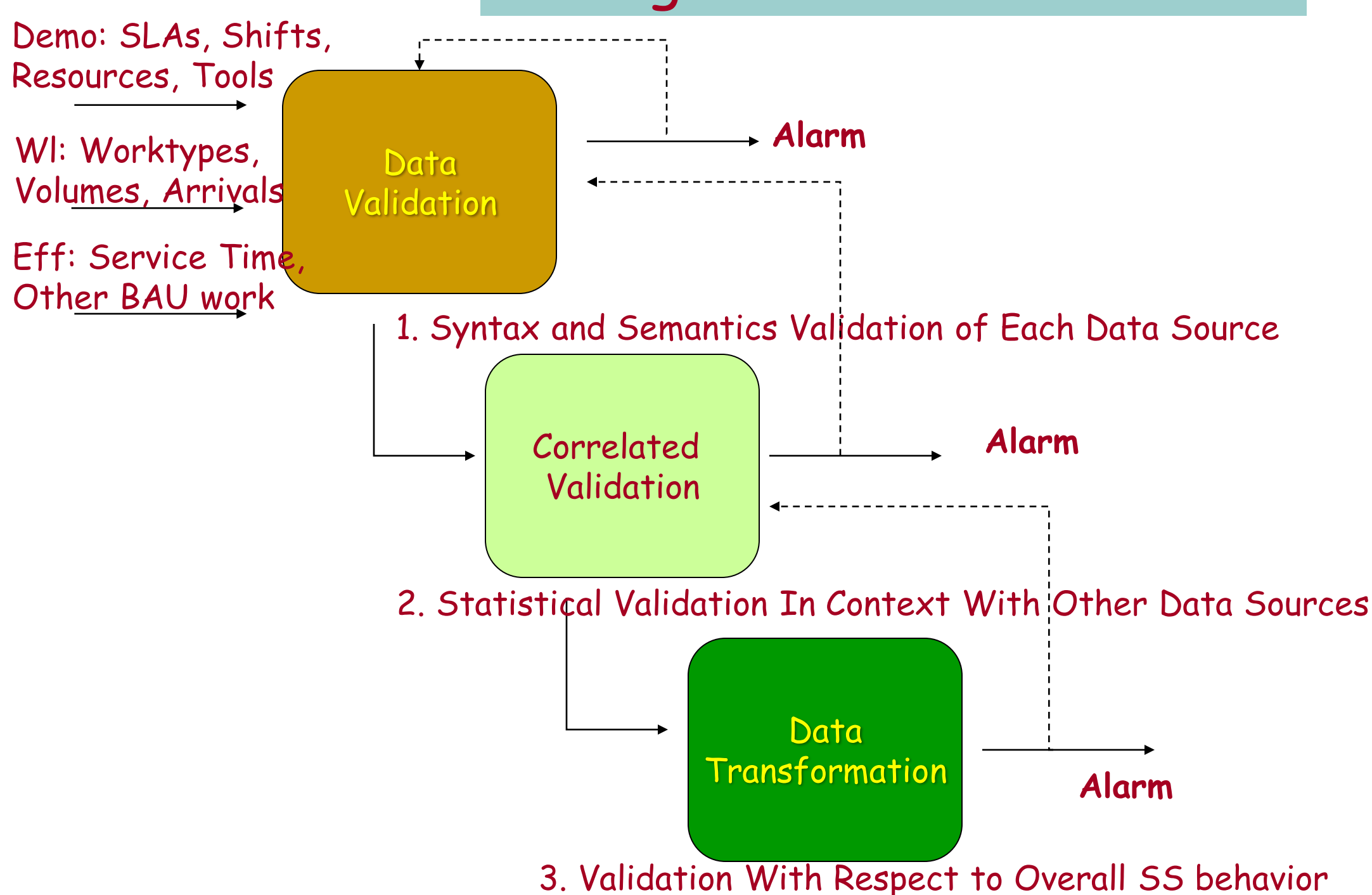
Objective: Automated Validation and Cleaning of Noisy Data for Analysis of Large Service Systems (SS)

- A Service System organizes resources & processes to *interact* with customers and produce *outcomes*
- Pool Modeling Program at IBM is designed to simulate and analyze system behavior and recommend optimal staffing levels
- Analysis requires large amounts of data, manual management of which is cumbersome and error-prone
- Data Portal for Pool Simulation facilitates storing, validation and analysis of distributed data sets

Common UI	Pool Modeling Portal (IBM-Websphere Portal) Single Sign-On, Common Enterprise UI, Role based Content, Security & Authorization	
Alarms & Perf. Mgmt	Rules Engine & Alarms (IBM-Websphere Application)	Dashboards (Custom Dashboard Framework)
Reporting	Reporting Engine (Custom Java-Based/Cognos) Intelligent Visibility, Enterprise Reporting, Steady-State Analytics	
Data Management	Data Model (DB2) Content Store	

- Demographic Data: Captures SLAs, Shifts, Business Hours, Resource skills, Tools, Affinities.
- Workload Data: Work in the Service System, volumes, arrival timestamps by type of work and account
- Effort: Types of work, effort spent on each activity, productive versus non-productive time

3 Stage Functional Process:



Data Validation

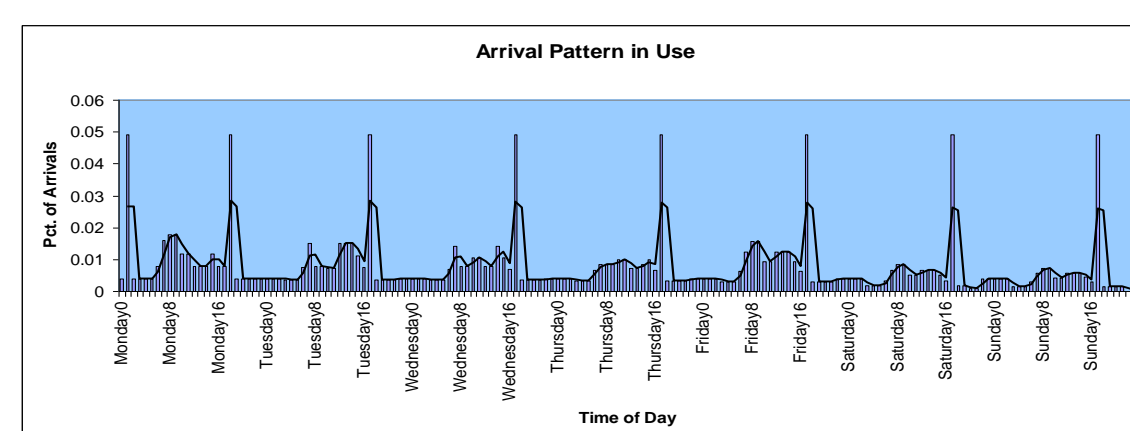
Shift & Account Mapping	Shift	Account 1	Account 2
Agent 1	1	0	0
Agent 2	1	1	0
Agent 3	1	1	1

Alarm: Agent is associated with no account

Data Portal validates each source of data for syntax, semantics, statistical properties and also validates the correlation of data across sources

Correlated Validation

Shifts	SA	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Shift 1	23	8	8	8	8	8		
		15	15	15	15	15		
Shift 2	1	0	0	0	0	0		
		23.5	23.5	23.5	23.5	23.5		

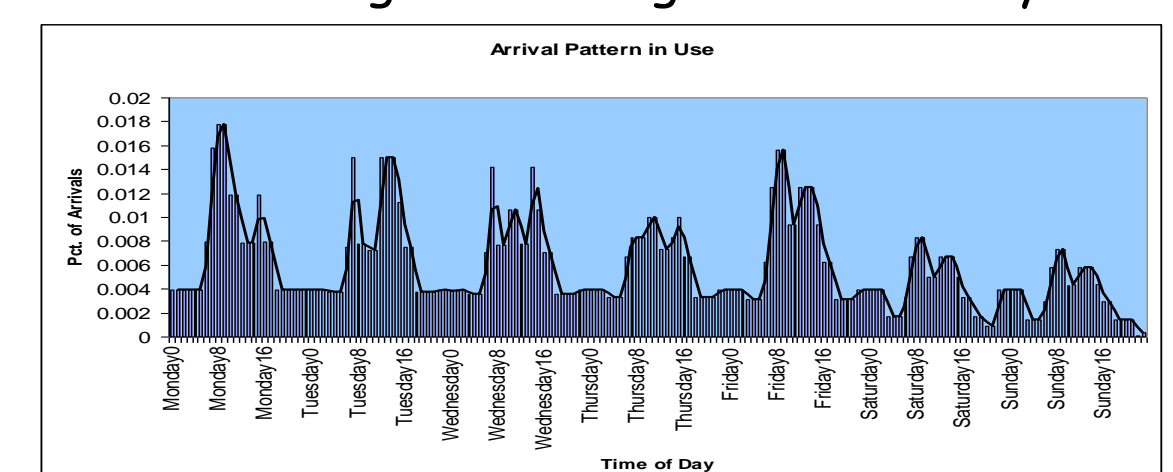


Alarm: Fails Statistical Validation:
 • Mis-alignment between Shifts and Workload data
 • High workload peaks (from WL data) times do not show enough agents as available (from Demo data)

Possible Solutions:

- Fix Shifts
- Fix workload Data

In this example, the workload peaks was due to erroneous data entries and once filtered the data was aligned with agent availability



SLA/SLO	Account1
Work Type: Problem	
Sev 1 Target Time (hour)	1C
Sev 2 Target Time (hour)	2C
Sev 3 Target Time (hour)	56B
Sev 4 Target Time (hour)	240B
Sev 1 Target Attainment Percent	92
Sev 2 Target Attainment Percent	92
Sev 3 Target Attainment Percent	90
Sev 4 Target Attainment Percent	90

Service Time	Sev 1 - Sev 2	Sev 3	Sev 4	
Skill TypeA Mean	174.8	127.0	149.0	130.6
Skill TypeA Stdev	88.0	0.0	133.5	151.7
Skill TypeB Mean	174.8	140.6	48.6	41.5
Skill TypeB Stdev	88.0	46.1	66.3	15.1
Skill TypeC Mean	178.5	174.6	86.6	12.6
Skill TypeC Stdev	82.7	65.7	42.7	17.5

Alarm: Fails Statistical Validation:
 • Mis-alignment between Service Times computed from effort and SLOs indicated in demographic
 • All Sev1 and Sev2 tickets will always miss SLOs as service time > SLO

SLA/SLO	Account1
Work Type: Problem	
Sev 1 Target Time (hour)	4C
Sev 2 Target Time (hour)	20C
Sev 3 Target Time (hour)	56B

Possible Solutions:
 • Fix effort data
 • Fix SLAs
 In this example the SLAs were wrong

Transformation

- Create Lognormal Distribution for Service Time
- Create Non-Homogeneous Poisson Arrival Rates
- Create Service Time Distributions across dimensions of work type, complexity, and severity