

PROJECTING PRISON POPULATIONS WITH SAS[®] SIMULATION STUDIO

State of NC SAS Users Group Meeting

July 16, 2015



Background

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- Sentencing Commission mandated to project prison population to help determine correctional resource needs
- Project focused on prison projections only
- Inputs
 - ▣ Inmate/Stock data
 - ▣ Court data
 - ▣ Revocation data
 - ▣ Growth estimates
- Outputs
 - ▣ Monthly total population projections
 - ▣ Annual projections

Old Model vs. New Model

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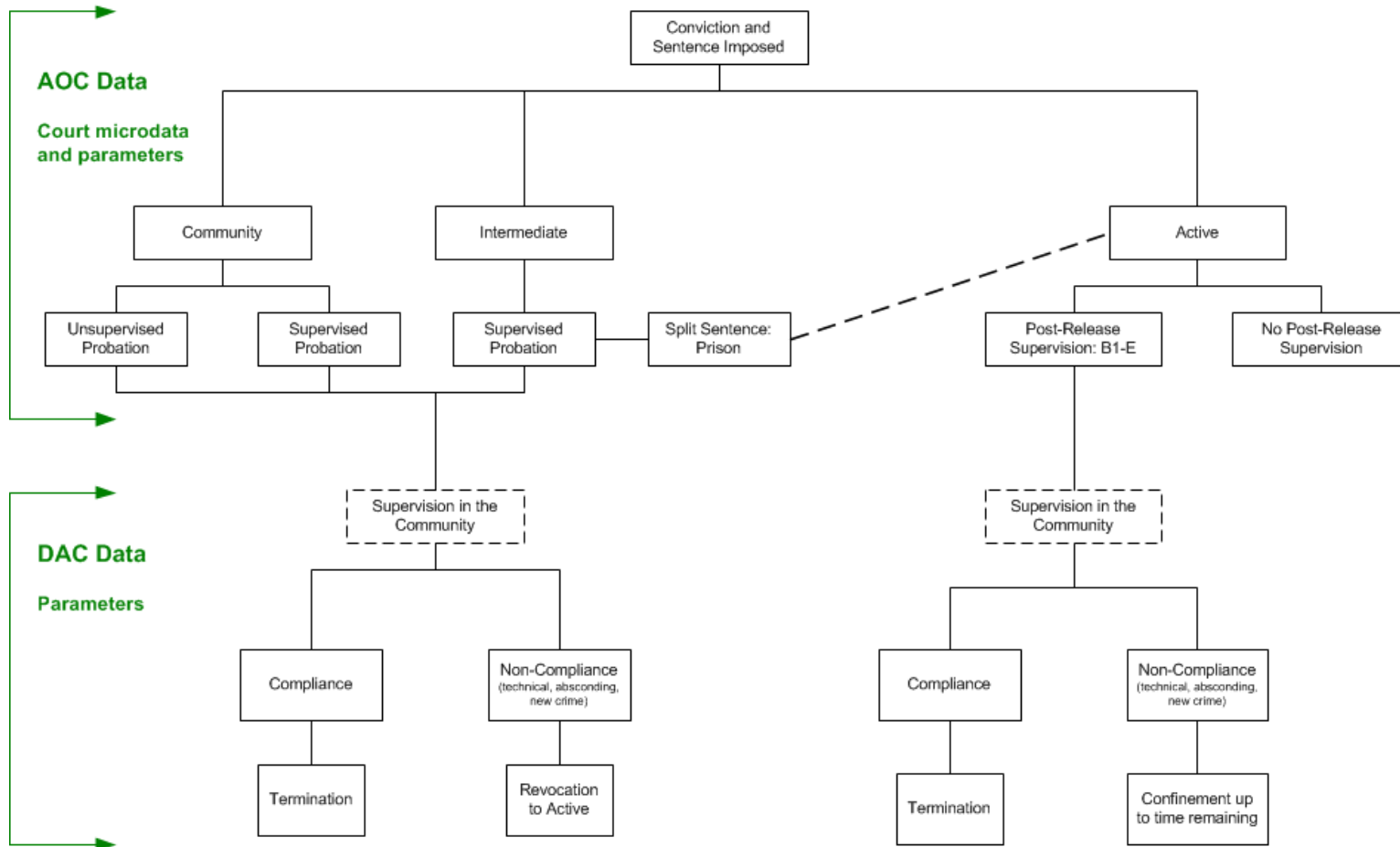
Old Model

- ❑ Black box
- ❑ Inability to adjust the model
- ❑ Requires manual data entry
- ❑ Developed and supported by an individual

New Model

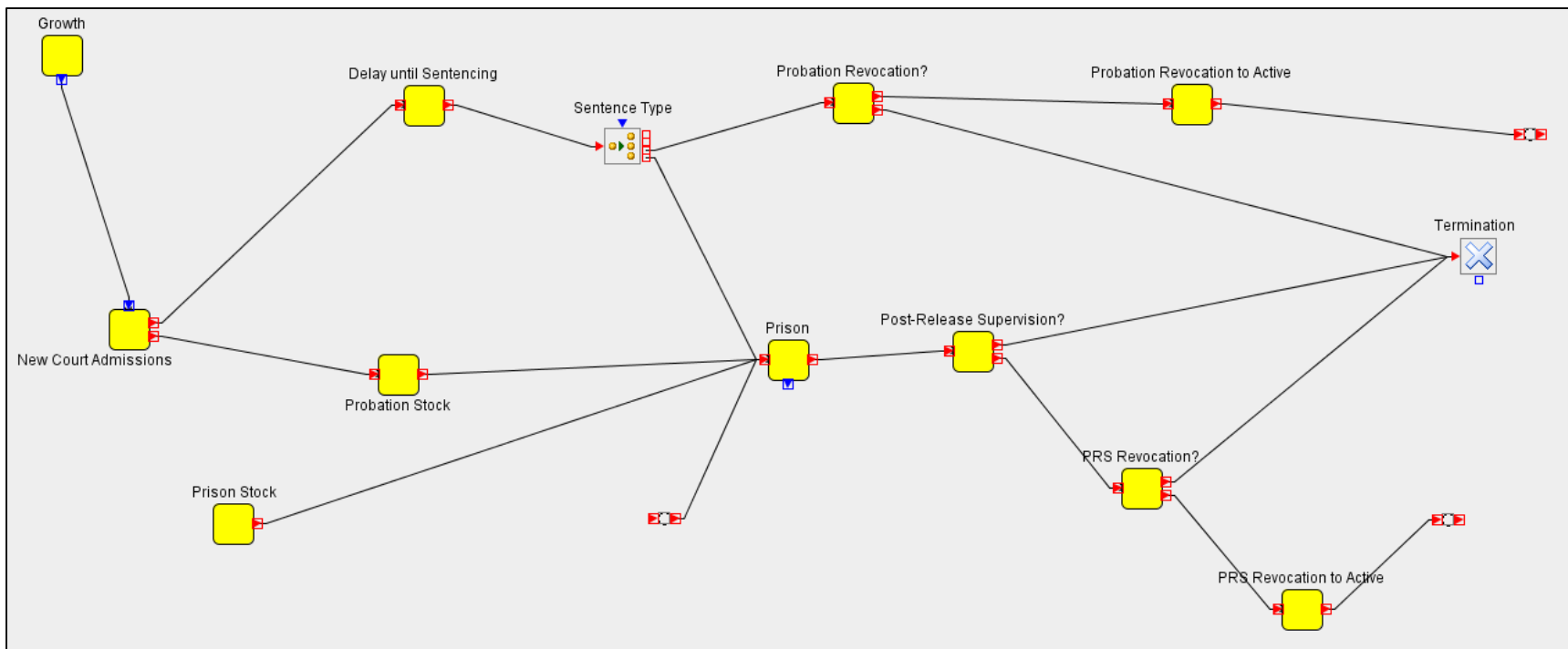
- ❑ Transparent
- ❑ Ability to adjust the model
- ❑ Driven by data sets and experiment window
- ❑ Sim Studio still under active development

Pre-JRA System Flow for Prison Population Projections: Felonies

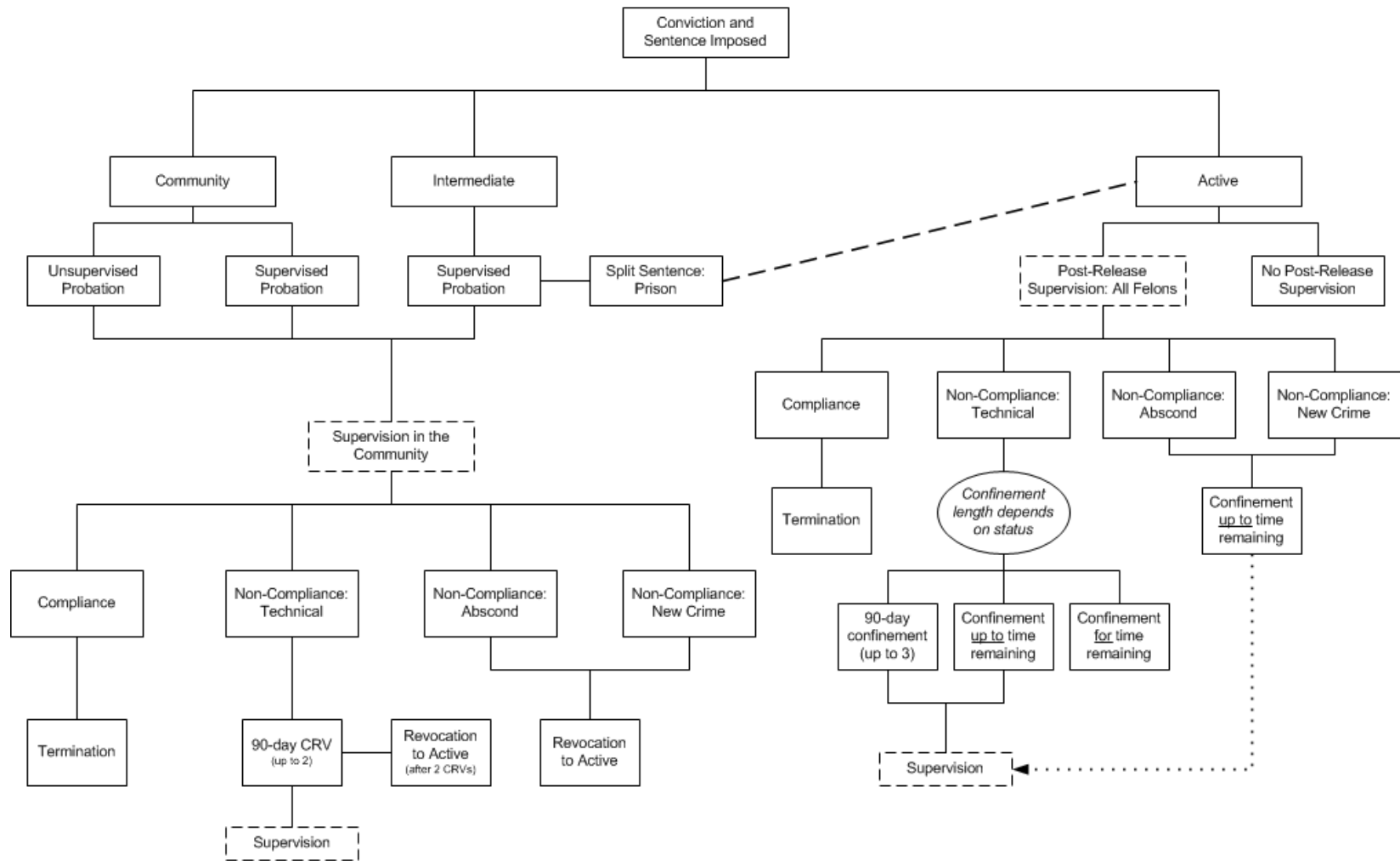


Overview of the Pre-JRA Model

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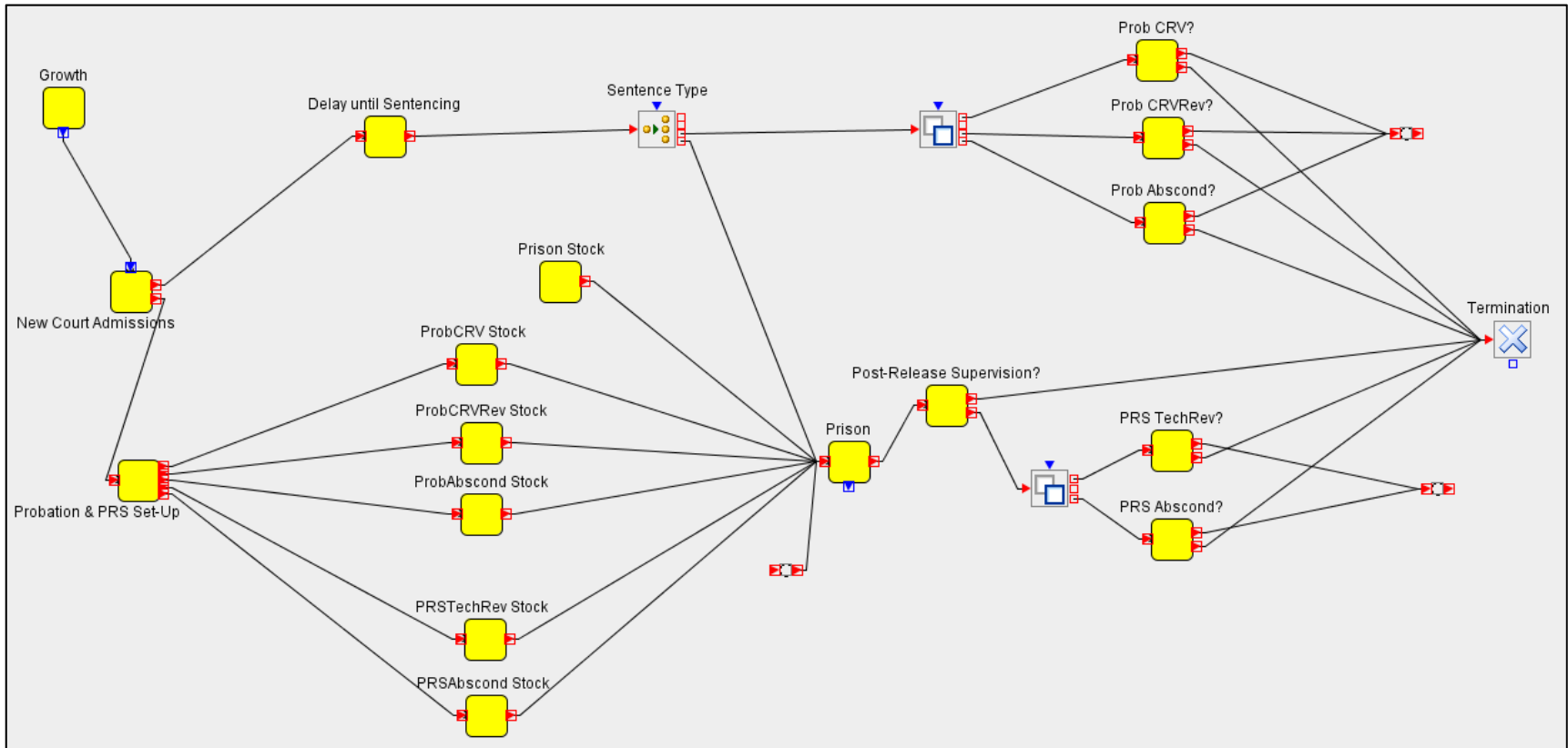
JRA System Flow for Prison Population Projections: Felonies



NOTE: This diagram provides a summary system flow. See also detailed system flow diagrams for Probation, Post-Release Supervision, and Post-Release Supervision for Sex Offenders.

Overview of the JRA Model

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Data

Court Data

Block Properties for Court Data Modifier

Assigned from: Independent Value Inputs An Observation Value Input

Full Assignment Selected Assignment Excluded Assignment

Entity Attribute	Included Observation Variable	Add Row
ActiveRate	ActiveRate	Remove Row
InitAge	Age	
AIC	AIC	
CaseNum	CaseNum	
Gender	Gender	
OffenseClass	OffenseClass	
OffenseType	OffenseType	
Term	PrisTime	
ProbAbscondRevLag	ProbAbscondRevLag	
ProbAbscondRevRate	ProbAbscondRevRate	
ProbAbscondRevTime	ProbAbscondRevTime	
ProbCRVLag	ProbCRVLag	
ProbCRVRate	ProbCRVRate	
ProbCRVRevLag	ProbCRVRevLag	
ProbCRVRevRate	ProbCRVRevRate	
ProbCRVRevTime	ProbCRVRevTime	
ProbCRVTime	ProbCRVTime	
ProbRevRate	ProbRevRate_adj	
ProbRevTime	ProbRevTime	
ProbSupvTime	ProbSupvTime	
PRSAbscondRevLag	PRSAbscondRevLag	
PRSAbscondRevRate	PRSAbscondRevRate	
PRSAbscondRevTime	PRSAbscondRevTime	
PRSRRevLag	PRSRRevLag	
PRSRRevRate	PRSRRevRate	
PRSRRevTime	PRSRRevTime	
PRSSupvTime	PRSSupvTime	
PRSTechRevLag	PRSTechRevLag	
PRSTechRevRate	PRSTechRevRate	
PRSTechRevTime	PRSTechRevTime	
Race	Race	
StartTime	SenMonth	
Weight	Weight	
ProbRevLag	ProbRevLag	

OK Apply Close

Inmate/Stock Data

Block Properties for Stock Data Modifier

Assigned from: Independent Value Inputs An Observation Value Input

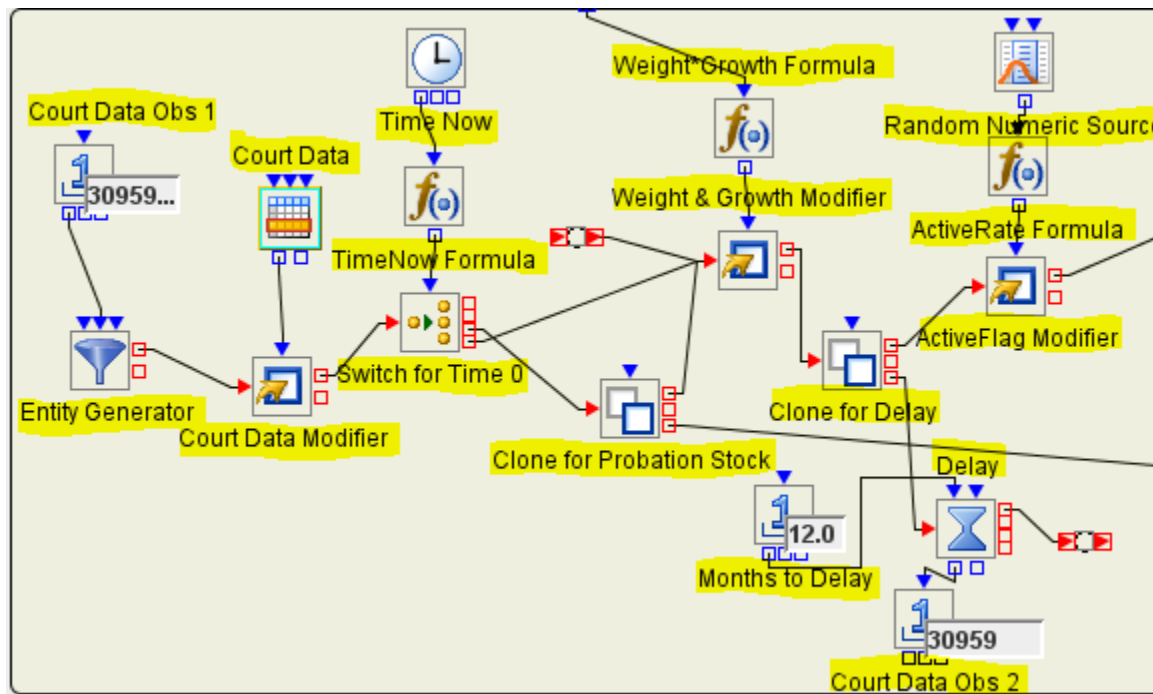
Full Assignment Selected Assignment Excluded Assignment

Entity Attribute	Included Observation Variable	Add Row
InitAge	Age	Remove Row
CaseNum	CaseNum	
Gender	Gender	
PRSAbscondRevLag	PRSAbscondRevLag	
PRSAbscondRevRate	PRSAbscondRevRate	
PRSAbscondRevTime	PRSAbscondRevTime	
PRSRRevLag	PRSRRevLag	
PRSRRevRate	PRSRRevRate	
PRSRRevTime	PRSRRevTime	
PRSSupvTime	PRSSupvTime	
PRSTechRevLag	PRSTechRevLag	
PRSTechRevRate	PRSTechRevRate	
PRSTechRevTime	PRSTechRevTime	
Race	Race	
JRA	JRA	
ConvClass	ConvClass	
ConvGroup	ConvGroup	
Term	PrisTimeLeft	
PRSRRevJRARate	PRSRRevJRARate	
PRSRRevJRALag	PRSRRevJRALag	
PRSRRevJRATime	PRSRRevJRATime	
PRSWarrantRate	PRSWarrantRate	
PRSWarrantLag	PRSWarrantLag	
PRSWarrantTime	PRSWarrantTime	

OK Apply Close

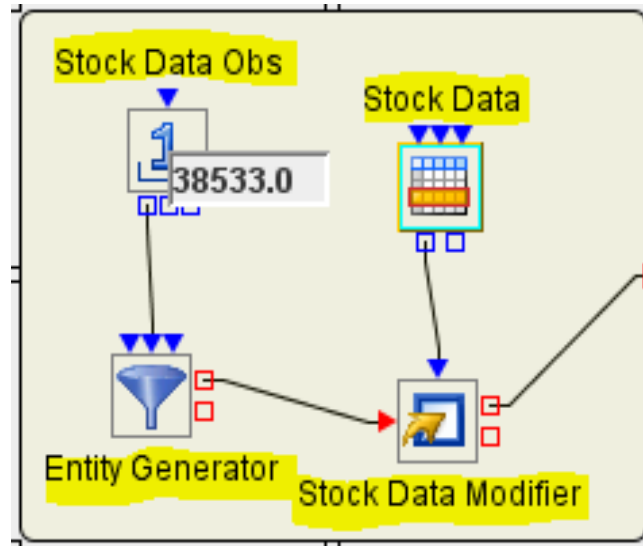
New Court Admissions

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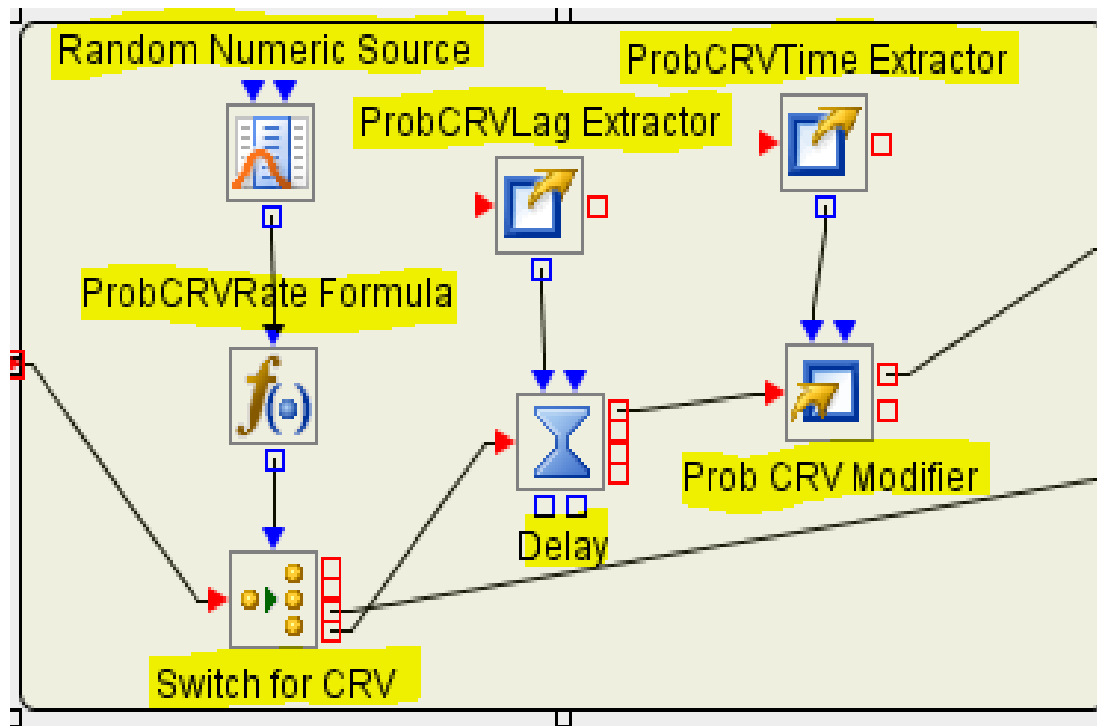
Prison Stock

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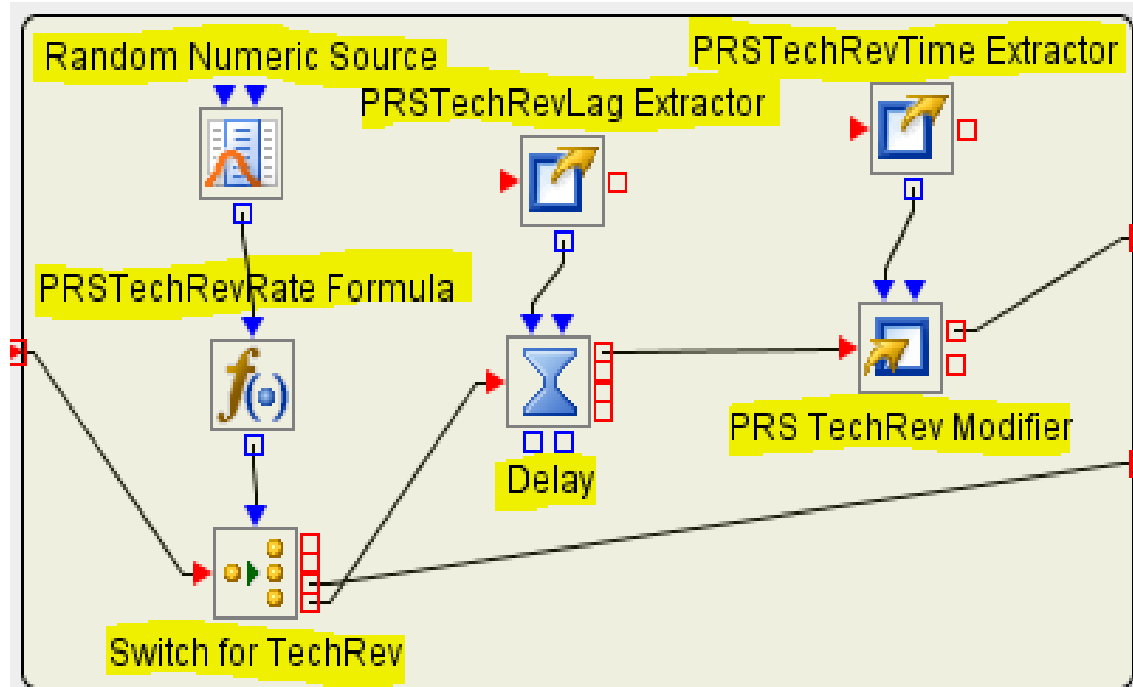
JRA: Probation CRV?

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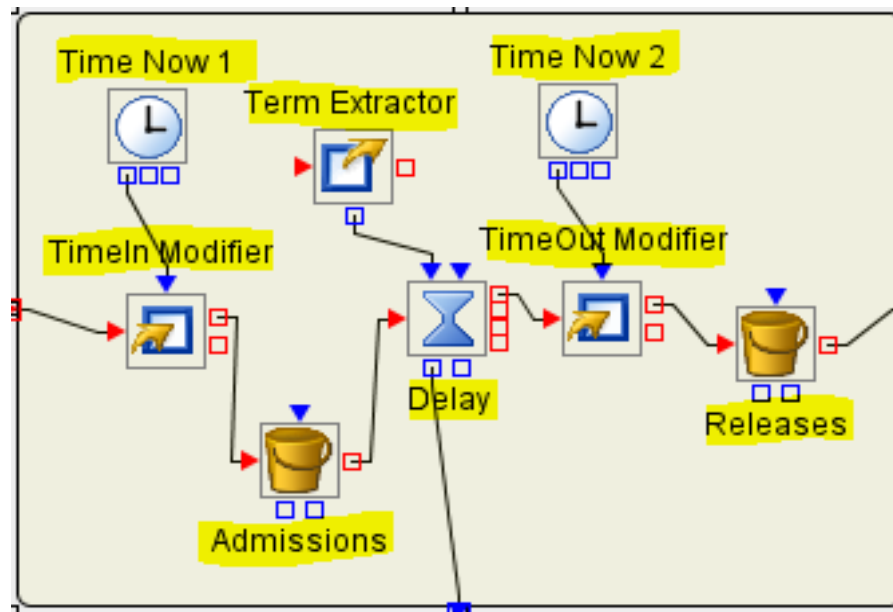
JRA: PRS Technical Revocation?

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Prison

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Prison Projections

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- Ten-year projections, overall and by variables of interest
 - ▣ Type of prison admission/release
 - ▣ Sex, age, offense class, etc.
- Initial projection data for DACJJ custody projections
- Impact projections

Output

□ Admission and Release Data

	CaseNum	Time	InitAge	Gender	ConvClass	ConvGroup	Weight	Type
256477	25514	26.3	24	2	90	6	0.8049316406	ProbRev
256478	25754	26.3	28	1	90	6	0.8049316406	ProbRevJRA
256479	25858	26.3	33	1	90	6	0.8049316406	ProbRevJRA
256480	25992	26.3	29	1	90	6	0.8049316406	ProbRevJRA
256481	26268	26.3	54	1	90	6	0.8049316406	ProbRevJRA
256482	27615	26.3	45	2	90	4	0.8049316406	ProbRevJRA
256483	27729	26.3	50	1	90	6	0.8049316406	ProbRevJRA
256484	28084	26.3	36	2	90	4	0.8049316406	ProbRevJRA
256485	9245	26.3	24	1	70	7	0.9669189453	PRSRvJRA
256486	19816	26.3	22	1	80	4	0.8499755859	PRSRvJRA

□ Prison Population Data

	Month	PrisPop	Adm_Tot	Rls_Tot	Adm_New	Adm_Prob	Adm_PRS	Sex_M	SexPct_M	Sex_F	SexPct_F	Group_Person	Group_Property	Group_DrugTraff	Group_NonTraffDrug	Group_HF	Group_HFBE	Group_Other
1	12	36,850	17423	17409	10201	5465	1756	33,899	92.0	2,951	8.0	18,269	5,401	1,998	3,225	5,550	297	2,110
2	24	37,062	17906	18292	10304	5529	2073	34,025	91.8	3,037	8.2	18,458	5,353	1,737	3,493	5,388	341	2,291
3	36	37,273	18091	18666	10590	5616	1884	34,205	91.8	3,068	8.2	18,722	5,294	1,672	3,558	5,223	376	2,430
4	48	37,103	18469	18625	10872	5742	1853	34,019	91.7	3,084	8.3	18,616	5,265	1,617	3,636	5,007	401	2,561
5	60	37,223	18616	18496	10960	5802	1852	34,087	91.6	3,135	8.4	18,723	5,291	1,586	3,692	4,879	413	2,638
6	72	37,371	18743	18595	11080	5831	1831	34,191	91.5	3,180	8.5	18,789	5,327	1,558	3,752	4,808	419	2,717
7	84	37,590	18909	18689	11196	5872	1837	34,389	91.5	3,201	8.5	18,887	5,380	1,540	3,789	4,779	437	2,778
8	96	37,900	19100	18790	11298	5942	1858	34,674	91.5	3,225	8.5	19,079	5,413	1,540	3,839	4,767	441	2,821
9	108	38,342	19276	18834	11445	5958	1873	35,078	91.5	3,263	8.5	19,352	5,481	1,554	3,875	4,778	450	2,852
10	120	38,744	19481	19079	11532	6062	1886	35,464	91.5	3,280	8.5	19,555	5,483	1,562	3,939	4,817	458	2,930

Resources

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- **Annual Prison Population Projections**

<http://www.nccourts.org/Courts/CRS/Councils/spac/Publication/Projections/Adult.asp>

- **SAS Global Forum Paper: Projecting Prison Populations with SAS[®] Simulation Studio**

<http://support.sas.com/resources/papers/proceedings13/155-2013.pdf>

- **SAS State and Local Connection Blog**

<http://blogs.sas.com/content/statelocalgov/2014/06/12/projecting-prison-resources/>

Contact Information

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<http://www.nccourts.org/courts/crs/councils/spac/>