University Admissions Application Processing

Using Computer Simulation to Evaluate Alternatives

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Objective

- To evaluate the potential impact of an alternative tool for processing admissions applications at a major metropolitan research university:
  - *Document Imaging System, "an electronic copy" of a document*
    - *applications, transcripts, test scores, and letters*

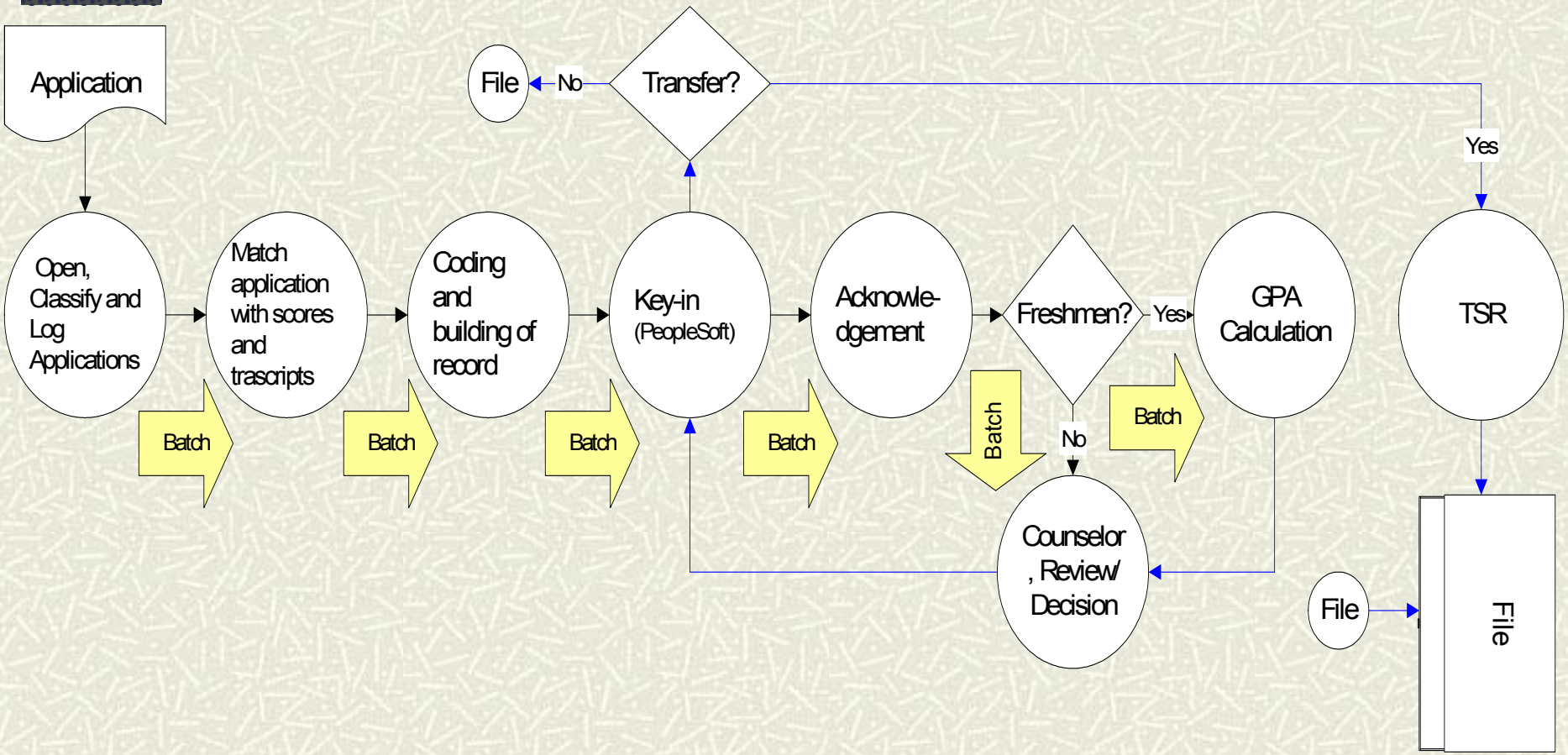
Background

- The Operational Excellence and Assessment Support office conducted a process analysis of the admission operations in the Undergraduate Admissions Office
- Undergraduate Admissions wanted to know the potential impact of a document imaging system on processing admission applications
- Part of a larger study to identify improvement opportunities

Background (continued)

- The scanned image of the admissions documents would substitute physical documents, thus minimizing the handling, move, and wait times during processing admission applications
- To evaluate the potential impact before implementing the system
  - *Computer Simulation Modeling*

Process Flowchart of the Current Undergraduate Admissions Operation



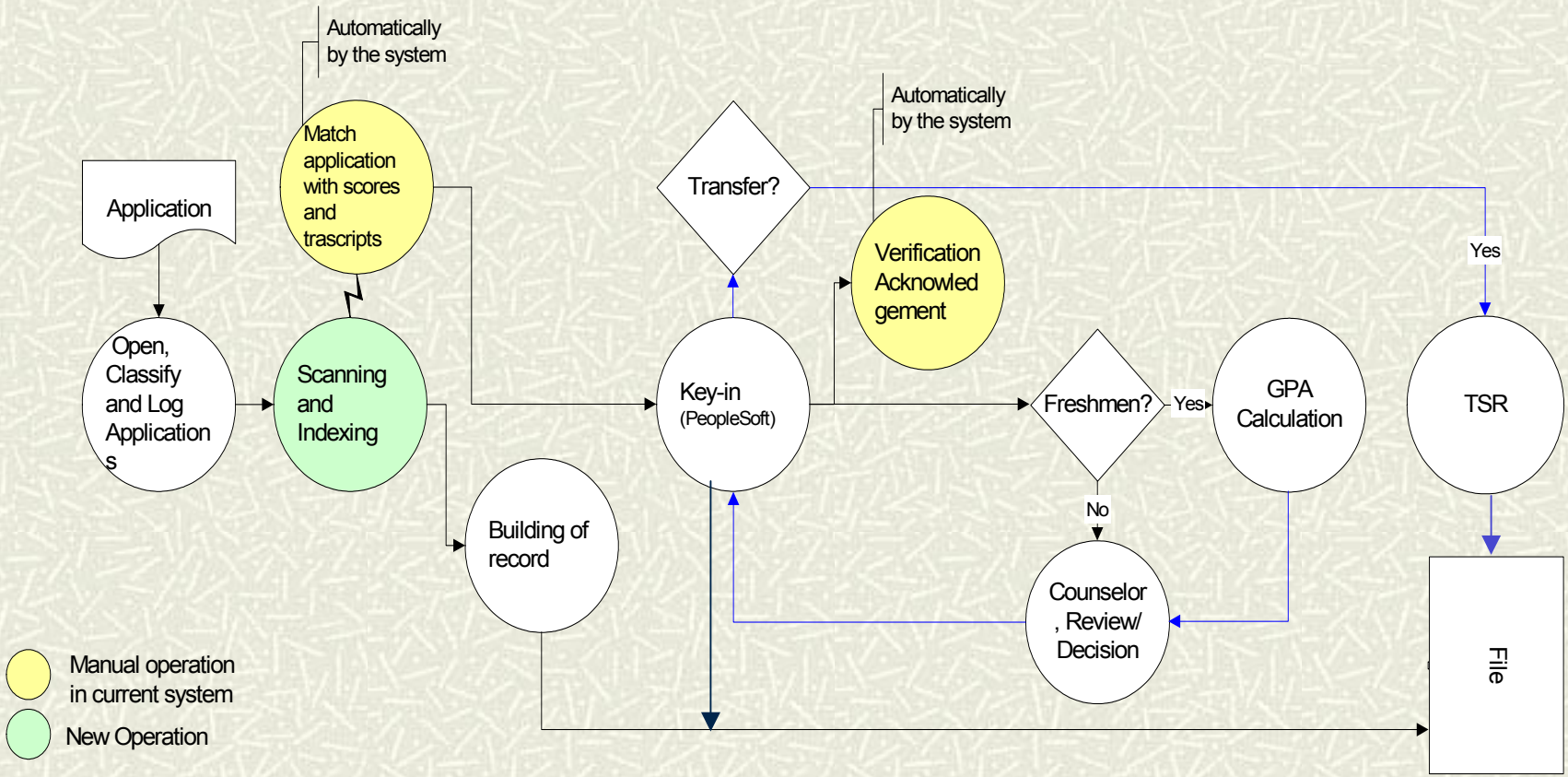
Key Elements of Current Admissions Operation

- Peak daily volume of 350 applications
- Approximately seven steps in the process
- Batch processing is used between steps where batches are held overnight
- Processing time per application: 12-15 minutes (best case) to 2 hours (worst case)
- Minimum completion time for an application is 7-8 days due to batching

Key Elements of Current System (continued)

- In order to work on the application, the physical record is necessary in every step of the process
- Physical record is moved from cubicle to cubicle and between two different floors
- Answering applicant inquiries can be, on occasion, difficult
  - need to have physical record

Process Flowchart of the Proposed System



Current vs. Proposed System- Key Differences

- Workflow
  - Physical record movement in current system versus “electronic workflow” in proposed system
  - Impact:
    - Move time between operations is reduced to zero
    - Wait time due to lot sizing is minimized
    - Application is available in following step almost immediately

Current vs. Proposed Systems- Key Differences, continued

- Building process of physical record
  - Manual within the current process versus automated within the proposed system
  - Impact: Reduction in lead time
- Customer service
  - Physical record may be required in current system versus all information available on-line in proposed system

Model – Computer Simulation

- Software: Arena®
- Three models
  - Current system
  - Proposed system – document imaging
    - Customer service included
    - Customer service removed

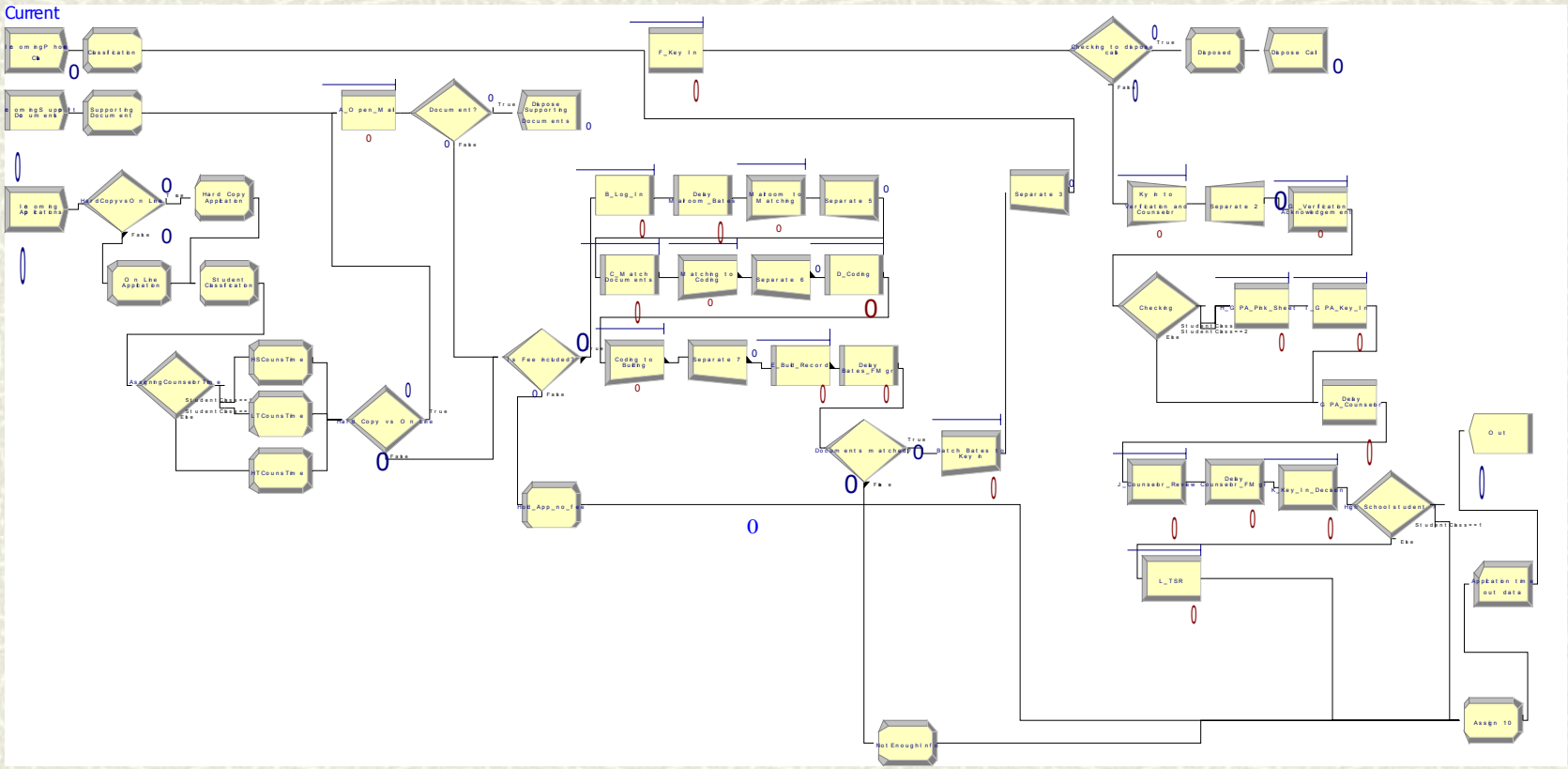
Data Collection and Model Construction

- Process flow
  - Interviews and discussion with ~ 15 employees
- Over 1,500 time and process observations
- New task (scanning of documents) in proposed system was based on observations of a similar operation in Graduate Admissions using an imaging system

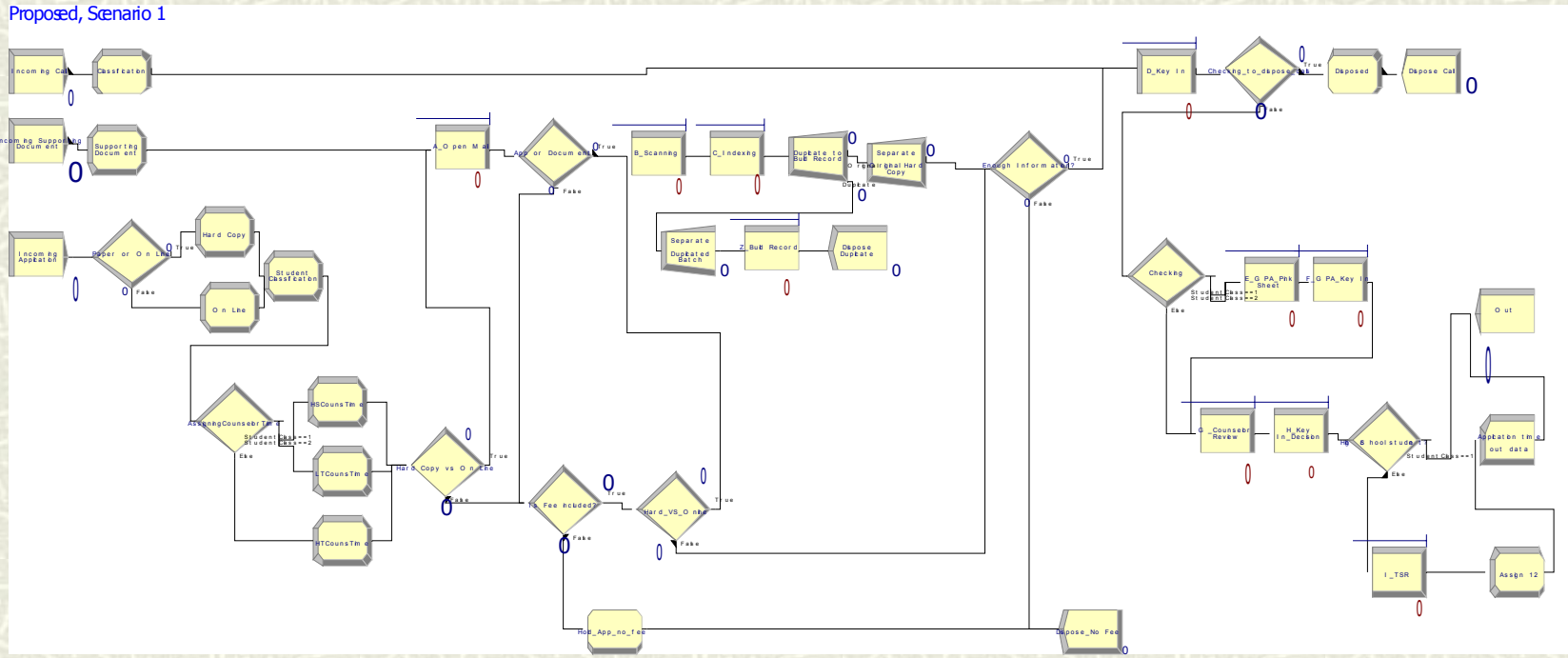
Processes and Probability Distributions

A_Open_Mail	Seize Delay Release	Value Added	ERLA(.177,2)
F_Key In	Seize Delay Release	Value Added	FileMgrProcessing
J_Counselor_Review	Seize Delay Release	Value Added	ProcessTime
H_GPA_Pink_Sheet	Seize Delay Release	Value Added	LOGN(.689,.386)
I_GPA_Key_In	Seize Delay Release	Value Added	LOGN(.76,.314)
L_TSR	Seize Delay Release	Value Added	UNIF(11,30)
K_Key_In_Decision	Seize Delay Release	Value Added	TRIA(0.6, 0.74, 2)
B_Log_In	Seize Delay Release	Value Added	.23+LOGN(.213,.135)
C_Match Documents	Seize Delay Release	Value Added	.24+.97*BETA(2.33,3.29)
D_Coding	Seize Delay Release	Value Added	0.23+logn(1.1,.79)
E_Build_Record	Seize Delay Release	Value Added	0.19+weib(1.6,2.39)
Delay GPA_Counselor	Delay	Non-Value Added	1
Delay Counselor_FMgr	Delay	Non-Value Added	1
Delay Mailroom_Bates	Delay	Non-Value Added	1
Delay Bates_FMgr	Delay	Non-Value Added	1
G_Verification Acknowled	Seize Delay Release	Value Added	1

Arena® Model – Current System



Arena® Model – Proposed System



Running the Simulation

- Replications
  - Number: 3
  - Length: 15 days (@ 9 hours, 7.5 + breaks)
  - Applications: 5,250 / replication
- Scenarios
  - Current
  - Proposed 1– document imaging system
  - Proposed 2 – document imaging + customer service reps. With re-distribution of resources

Sample Results, Total Output and Lead Time

Model	Current		Proposed, Scenario 1		Proposed, Scenario 2	
Statistic	Average	95% Interval Half Width	Average	95% Interval Half Width	Average	95% Interval Half Width
Total Output (Applications)	1,273	57	2,665	173	2,655	314
Total lead time/application (hours)	78	0.64	25	2.5	26	1.6

Sample Results, Utilization of Resources

	Current		Proposed 1		Proposed 2	
Work Center	Average (%)	Half Width	Average (%)	Half Width	Average (%)	Half Width
Mailroom	82	0	96	0	96	0
Bates/Coding/Build	90	1	N/A	N/A	N/A	N/A
File Managers (9 in current and proposed 1, 6 in proposed 2)	15	3	32	4	42	6
Verification/ Acknowledgement	6	0	N/A	N/A	N/A	N/A
GPA Calculation	11	0	28	1	30	5
Counselors	20	2	60	2	62	4
TSR Managers	30	3	98	5	99	2
Customer Service Reps.	N/A	N/A	N/A	N/A	14	3

Sample Results, What if Analysis

Proposed 1	Redistribution of Resources		Change in Scheduled Utilization	
Work Center	From	To	From	To
Mailroom	3	5	96	95
Bates/Coding/Build	N/A	N/A	N/A	N/A
File Managers (9 in current and proposed 1, 6 in proposed 2)	9	6	32	65
Verification/ Acknowledgement	N/A	N/A	N/A	N/A
GPA Calculation	2	1	28	76
Counselors	6	6	62	87
TSR Managers	6	8	98	98

Conclusion

- Simulation has proven to be a useful tool in understanding the potential implications of system prior to its implementation
- The simulation indicates that imaging system improves the turn around time of admission application processing
- Simulation is a useful OR tool in higher education