Insurance Portfolio Management

Michael Genesereth Computer Science Department Stanford University

Insurance Policies









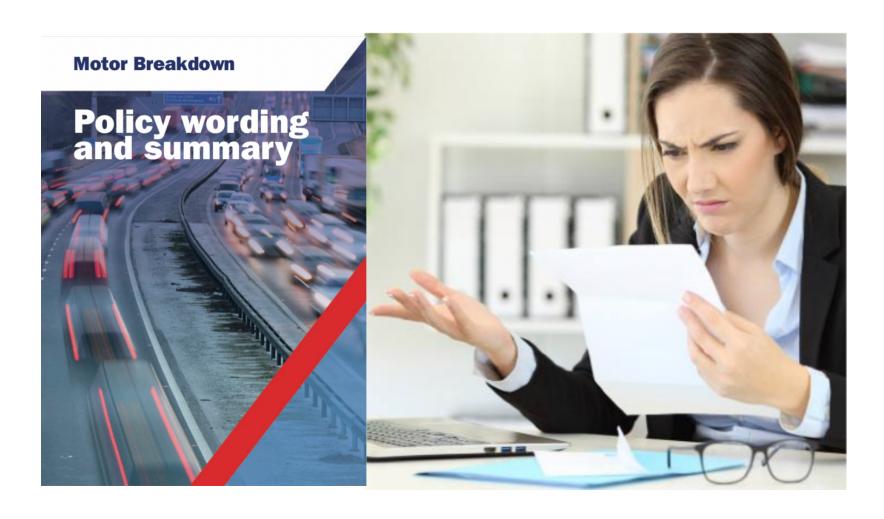
Example



Insurance Portfolio Management

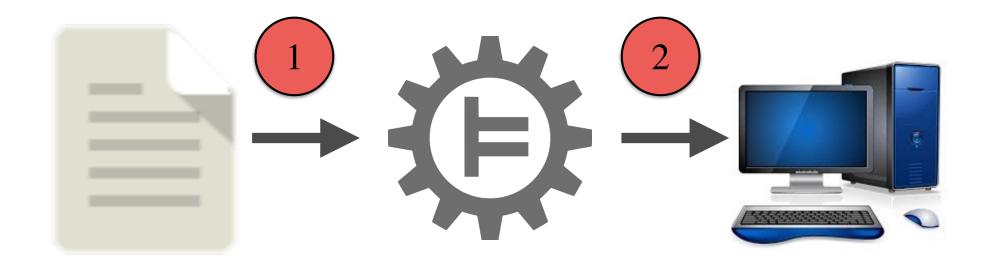
Insurance portfolio management (IPM) is the process of managing *overlapping insurance policies* with an eye to *minimizing insurance costs* while *ensuring adequate coverage*.

Complexity of Insurance Policies



Policies are complex, incomplete, inconsistent.

Computable Contracts



From Text to Computable Contracts to Automation





Steve Squirrel Sign Out



Products

Click on the link to view available insurance products.



People

Click on the link to view or add people you would like to include on your policies.



Policies

Click on the link to view, add, or analyze policies.



Properties

Click on the link to view or add properties that are insured or that you wish to insure (automobiles, houses, etc.).



Claims

Click on the link to view, add, or analyze claims.



Events

Click on the link to view recorded events (accidents, fires, etc.) or to record new events.



Policies

CodeX Insurance Analyst

Steve Squirrel Sign Out

Policies											
Policy	Insurer	Туре	Insuree	Begin	End	Actions					
policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2021_01_01	2021_12_31	≘ <\ u					
policy1234567822	axa	axa_travel_policy	sally_squirrel	2021_01_01	2021_12_31	≘ < ™					
policy1234567831	codex	codex_plana	steve_squirrel	2021_01_01	2021_12_31	≘ Q. Ū					
policy1234567832	codex	codex_planb	steve_squirrel	2021_01_01	2021_12_31	≘ ∢ n					
policy1234567833	codex	codex_planc	steve_squirrel	2021_01_01	2021_12_31	≘ ∢ n					
policy1234567834	codex	codex_pland	steve_squirrel	2021_01_01	2021_12_31	≘ < ™					
policy1234567841	visa	visa_signature	sally_squirrel	2021_01_01	2021_12_31	≘ Q. Ū					
			Add Policy								



Claims

•



C

↑ 888 +



Cla	im
Not co	overed
Claim: claim31 Repair: repair31 Collision: collis Vehicle: vehicle Agreement: rer Date: 2023_10_31	ion31
Repair	Vehicle
Id: repair31 Vehicle: vehicle31 Repair Shop: outback_auto_repair Start Date: 2023_08_24 End Date: 2023_08_31	Id: vehicle31 Make: triumph Type: sportscar
Collision	Rental Agreement
Id: collision31 Driver: steve_squirrel Vehicle: difference Activity: racing Country: usa Date: 2023_08_24	Id: rental31 Vehicle: vehicle31 Driver: steve_squirrel Locale: usa Start: 2023_06_01 End: 2023_06_15



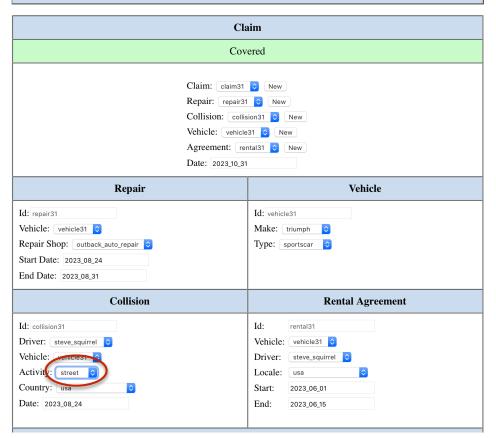
•





Products Policies Claims People Properties Events

	Policies										
	Policy	Insurer	Туре	Insuree	Begin	End	Actions				
	policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	₽ Q				
	policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	₽ Q				
	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	₽ Q				
	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	₽ Q				
	policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	₽ Q				
	policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	B Q				
✓	policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	 <u></u> ■ Q				

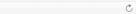


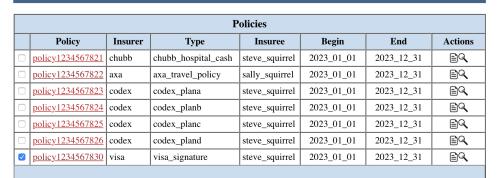


Claims

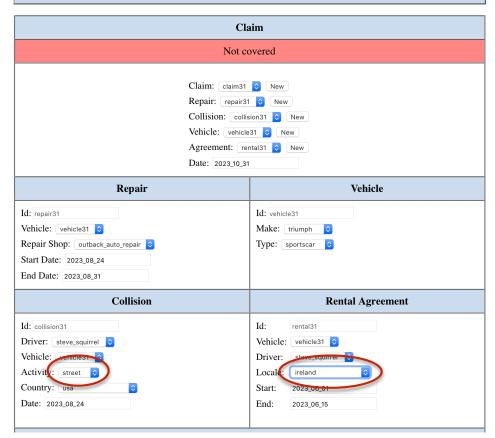
Policies

•





People







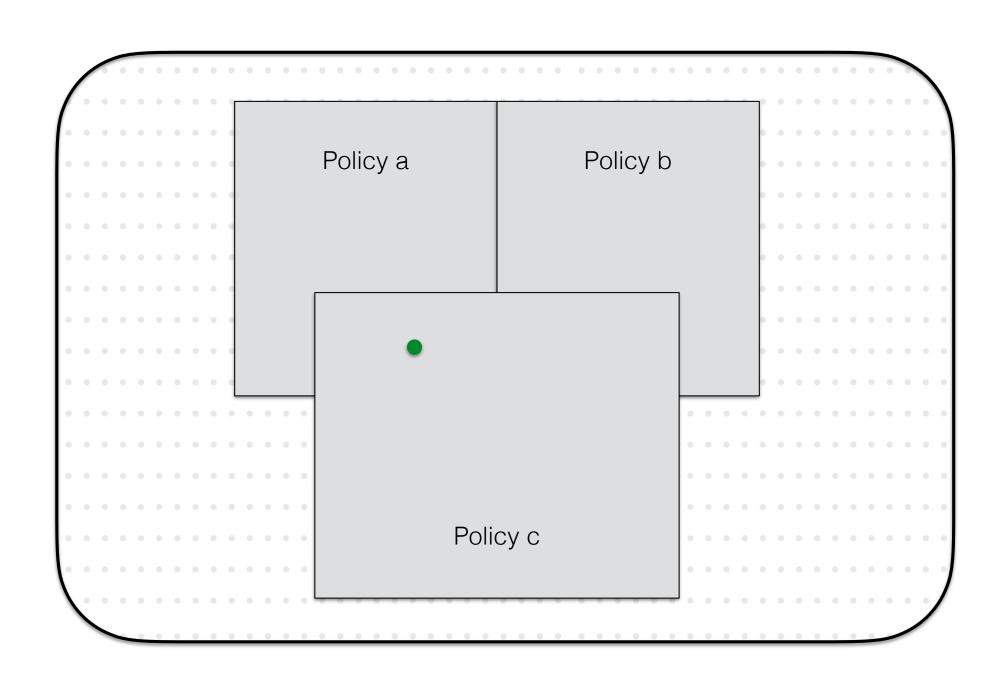
888 +

Claims	People	Properties	
--------	--------	------------	--

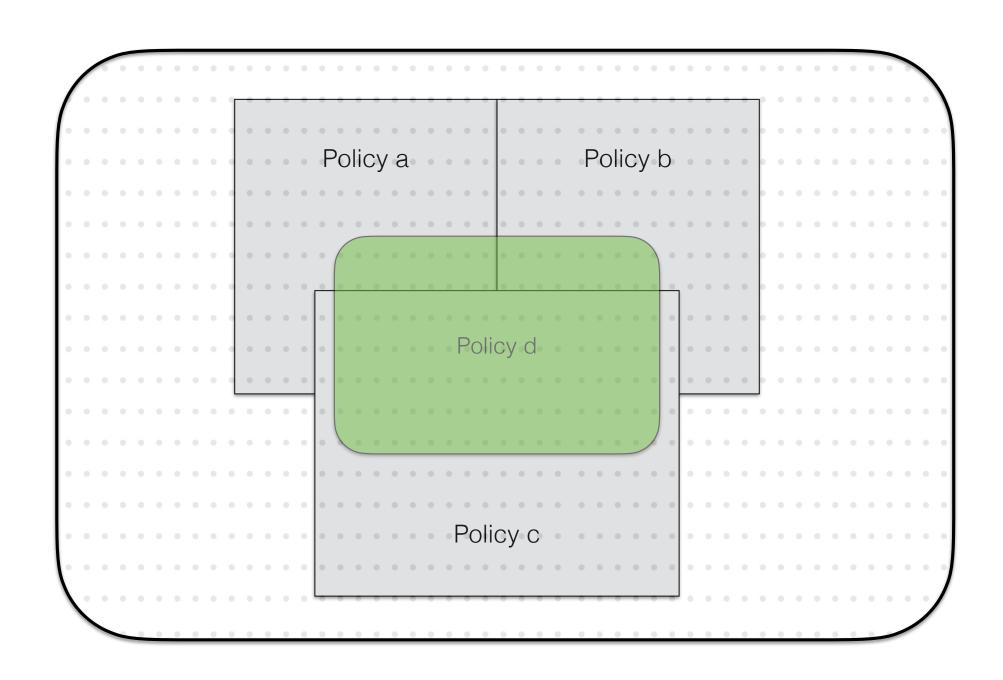
			P	olicies			
	Policy	Insurer	Туре	Insuree	Begin	End	Actions
P	policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	B Q
✓	policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	■Q
0	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	■Q
	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	B Q
	policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	■Q
	policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	■Q
	policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	■Q

Cla	aim
Cov	ered
Claim: claim31 Repair: repair3 Collision: collic Vehicle: vehicle Agreement: re Date: 2023_10_33	New Sion31 New New Natl New New Natl New
Repair	Vehicle
Id: repair31 Vehicle: vehicle31 Repair Shop: outback_auto_repair Start Date: 2023_08_24 End Date: 2023_08_31	Id: vehicle31 Make: triumph ▼ Type: sportscar ▼
Collision	Rental Agreement
Id: collision31 Driver: steve_squirrel Vehicle: conneres: Activity: street Country: usa Date: 2023_08_24	Id: rental31 Vehicle: vehicle31 Oriver: store-squirrer Coal ireland Start: 2023_06_01 End: 2023_06_15

Claims Analysis



Portfolio Analysis





Steve Squirrel Sign Out

Products	Policies	Claims	People	Properties	Events

Sources									
Policy	Insurer	Туре	Insuree	Begin	End				
policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ			
policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ			
policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ			
policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31				
policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31				
policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ			
policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ			

Targets									
Policy	Insurer	Туре	Insuree	Begin	End				
policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ			
policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ			
policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	B Q			
policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	B Q			
policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	B Q			
policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31				
policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	B Q			
	l								









Steve Squirrel Sign Out

Products	Policies	Claims	People	Properties	Events

			Sou	rces			
	Policy	Insurer	Туре	Insuree	Begin	End	
	policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ
	policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ
	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ
	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ
	policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ
0	policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ
	policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ

	Insurer chubb	Type chubb_hospital_cash	Insuree	Begin	End	
	chubb	abubb baspital aash			2.114	
Jioy 1224567922		chubb_nospitai_cash	steve_squirrel	2023_01_01	2023_12_31	BQ
nicy1234307822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ
olicy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ
olicy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ
olicy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ
olicy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ
	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ
1	icy1234567825 icy1234567826	icy1234567825 codex icy1234567826 codex	icy1234567825 codex codex_planc icy1234567826 codex codex_pland	icy1234567825 codex codex_planc steve_squirrel icy1234567826 codex codex_pland steve_squirrel	icy1234567825 codex codex_planc steve_squirrel 2023_01_01 icy1234567826 codex codex_pland steve_squirrel 2023_01_01	icy1234567825 codex codex_planc steve_squirrel 2023_01_01 2023_12_31 icy1234567826 codex codex_pland steve_squirrel 2023_01_01 2023_12_31



Steve Squirrel Sign Out

Products	Policies	Claims	People	Properties	Events

	Sources							
		Policy	Insurer	Туре	Insuree	Begin	End	
		policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ
•	<u> </u>	rolicy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ
t		policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	
		policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	
		<u>policy1234567825</u>	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	
		<u>policy1234567826</u>	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	
		policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ

	Targets							
	Policy	Insurer	Туре	Insuree	Begin	End		
	policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ	
✓	policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ	
	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ	
	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ	
	policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ	
	policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ	
✓	policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ	



•

CodeX Insurance Analyst

127.0.0.1

Steve Squirrel Sign Out

C

Products **Policies** Claims People Properties Events

	Sources							
		Policy	Insurer	Type	Insuree	Begin	End	
		policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ
	0	policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ
	<u> </u>	pblicy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ
1		policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ
		<u>policy1234567825</u>	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ
		<u>policy1234567826</u>	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ
		policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ
Ì								

Targets							
	Policy	Insurer	Type	Insuree	Begin	End	
	policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ
	policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	B Q
/	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	B Q
	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	B Q
	policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	B Q
	policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	B Q
	policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	B Q
		<u> </u>		1	_ <u>-</u>		_









Steve Squirrel Sign Out

C

Products	Policies	Claims	People	Properties	Events

		Sources							
		Policy	Insurer	Туре	Insuree	Begin	End		
		policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ	
		policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	B Q	
	þ	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ	
	✓	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ	
1		policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ	
		policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ	
		policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ	

Targets						
End	Begin	Insuree	Туре	Insurer	Policy	
23_12_31	2023_01_01	steve_squirrel	chubb_hospital_cash	chubb	policy1234567821	
23_12_31	2023_01_01	sally_squirrel	axa_travel_policy	axa	policy1234567822	
23_12_31	2023_01_01	steve_squirrel	codex_plana	codex	policy1234567823	
23_12_31	2023_01_01	steve_squirrel	codex_planb	codex	policy1234567824	✓
23_12_31	2023_01_01	steve_squirrel	codex_planc	codex	policy1234567825	
23_12_31	2023_01_01	steve_squirrel	codex_pland	codex	policy1234567826	
23_12_31	2023_01_01	steve_squirrel	visa_signature	visa	policy1234567830	
23_	2023_01_01	steve_squirrel	visa_signature	visa	policy1234567830	













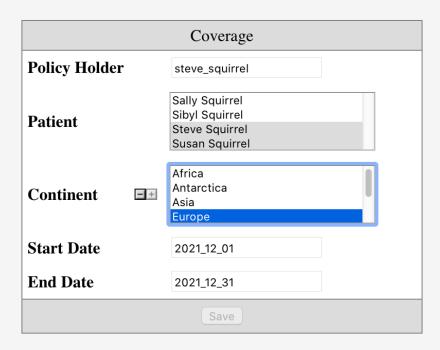
Steve Squirrel Sign Out

Products	Policies	Claims	People	Properties	Events

	Sources							
		Policy	Insurer	Туре	Insuree	Begin	End	
		policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	BQ
		policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	BQ
	<u> </u>	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ
	<u> </u>	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ
1		policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ
		policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ
		policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ

		Targets							
		Policy	Insurer	Туре	Insuree	Begin	End		
		policy1234567821	chubb	chubb_hospital_cash	steve_squirrel	2023_01_01	2023_12_31	₽ Q	
		policy1234567822	axa	axa_travel_policy	sally_squirrel	2023_01_01	2023_12_31	₽ Q	
. [✓	policy1234567823	codex	codex_plana	steve_squirrel	2023_01_01	2023_12_31	BQ	
. [✓	policy1234567824	codex	codex_planb	steve_squirrel	2023_01_01	2023_12_31	BQ	
. [✓	policy1234567825	codex	codex_planc	steve_squirrel	2023_01_01	2023_12_31	BQ	
		policy1234567826	codex	codex_pland	steve_squirrel	2023_01_01	2023_12_31	BQ	
		policy1234567830	visa	visa_signature	steve_squirrel	2023_01_01	2023_12_31	BQ	

From Policies to Requirements



Requirements Analysis

Desired Coverages

Coverage	Description	Rules
Goal 1	Insuree, spouse, and kids covered in USA	Rules
Goal 2	Insuree covered for multiple trips to Japan and Korea	Rules
Goal 3	Spouse covered for trip to Australia	Rules

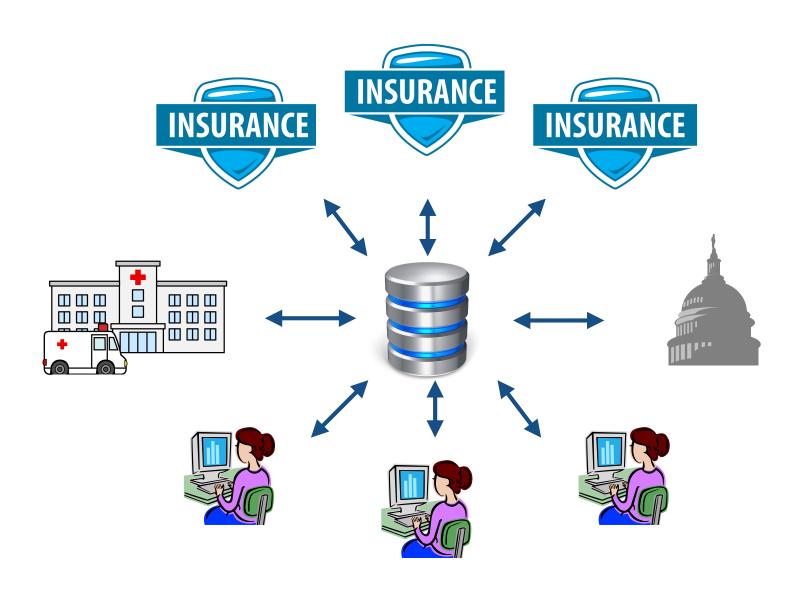
Available Policies

Policy	Description	Rules
Policy a	Insuree, spouse, and kids covered in North America	Rules
Policy b	Insuree covered anywhere in the world	Rules
Policy c	Spouse covered anywhere in the world	Rules
Policy d	Children covered anywhere in the world	Rules
Policy e	Family covered in Europe	Rules
Policy f	Family covered in South America	Rules
Policy g	Family covered in Asia	<u>Rules</u>
Policy h	Spouse covered in Oceania	Rules

Analyze

Suggest

Computable Insurance Ecosystem





Legal Empowerment through Information Technology