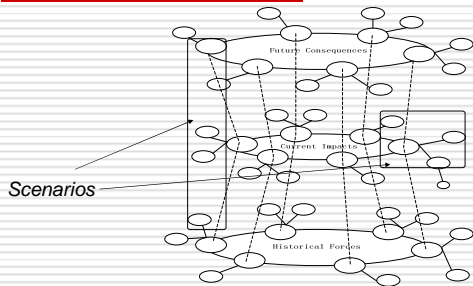




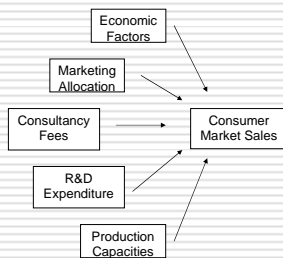
## Scenarios and Administrator



## Generating Scenarios

- Need to map to *simulation entities*
  - But only certain entities can be manipulated by administrators, i.e., administrative parameters
- Need to test the setting of the parameters
  - Requires the players' input.
- ➔ Testing scenarios is laborious and time-consuming. Support?

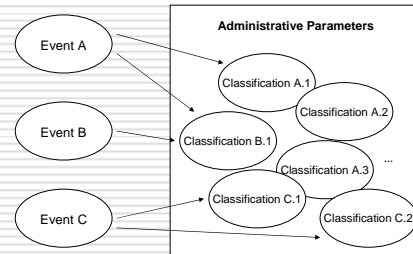
## Simulation Entities



Plant	
<b>Parameters</b>	<b>Decisions</b>
<ul style="list-style-type: none"> <li>• Unit Cost of Plant Capacity</li> <li>• Unit Operation Cost</li> <li>• Depreciation Rate</li> <li>• Optimal Plant Maintenance Factor</li> <li>• Unit Selling Price</li> <li>• Reduction Factor for Capacity Per Unit Plant Value</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance Allocation</li> </ul>
<b>Constraints</b>	<b>Outcomes</b>
<ul style="list-style-type: none"> <li>• Minimum Plant Capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Plant Value</li> <li>• Current Capacity</li> <li>• Plant Maintenance Expenditure</li> </ul>

## Mapping Scenarios

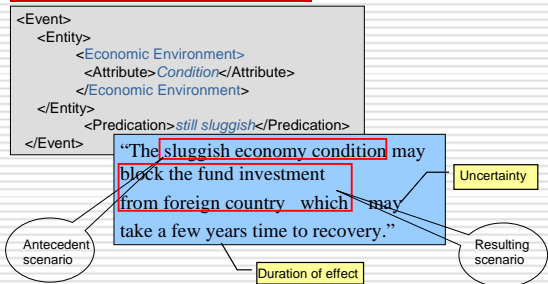
Scenario Knowledge      Game Knowledge



## Representation of a Scenario

<<Scenario>...</Scenario>	A scenario
<Event>...</Event>	An <i>event</i> . Event has an attribute id which is used for the indexing of event.
<Entity>...</Entity>	An <i>entity</i>
<Attribute>...</Attribute>	An attribute of an <i>entity</i>
<Action>...</Action>	An <i>action</i>
<Relation>...</Relation>	An interactive relation between events
<Uncertainty>...</Uncertainty>	The uncertainty factor in the description of an event and relation
<Life>...</Life>	The duration of an event or relation's effectiveness
<Predication>...</Predication>	The depiction of attributes

## Representation of a scenario

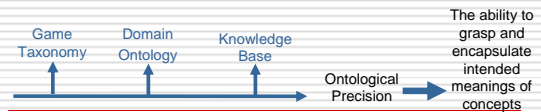


## Features of ScenGen

- A knowledge repository for scenarios
- Interfaces for editing the various concepts and knowledge in the scenarios
- A web crawler that harvests from a specified domain of web sites to compile a vast resource archive, containing relevantly extracted articles of business-related information
- The ability to search within this pool of articles to choose the most appropriate article and combine a chosen section of information in this article, to be called scenario background, with the existing content of scenarios.

## ScenGen Architecture

- Ontology is a model of knowledge, consisting of vocabulary containing concepts belonging to a specialized subject matter
- Domain Ontology – Business & Economics
- Game Taxonomy – Business Simulation Game
- Knowledge Base – SCENGEN



## The Domain Ontology

- Meta Layer
  - *Entities, attributes, actions, relations, states, events, time*
- Semantic Layer
  - abstract conceptions in business and economics world, organized according to Meta layer
- Instance Layer
  - Reification of the concepts in semantic layer

## The Domain Ontology

### Semantic layer

- Identified entities:
  - *government,*
  - *enterprise,*
  - *people,*
  - *resources,*
  - *products,*
  - *market,*
  - *consumers*
  - *and economic environment*

## The Domain Ontology

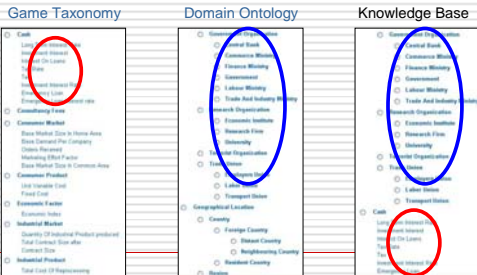
Classes		Instances
Core Term	Element Term	
Activity	Investment	Private Investment, Equipment Investment, Fixed Investment
Industry	Mining Industry	Energy, Metal, Precious Metal, Mineral
Indicator	Business Risk	Political Risk Indicator, Index of Severity

## The Game Taxonomy

Parameters	Meanings
Tax Rate	The corporate income tax rate that a company is liable to pay.
Long Term Interest Rate	The interest rate set on long term loans by banks.
Ordering Cost of Raw Material	The fixed cost required to order raw materials.
Unit Cost of Operating Plant	The unit cost of operating the machines and processes of the plant

## The Knowledge Base in ScenGen

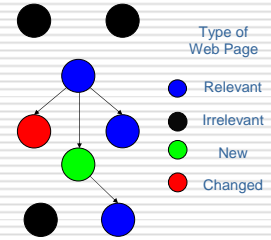
- Inherits from Domain Ontology and Game Taxonomy



## Resource Building

The web crawler

- Focused crawler
  - crawls all existing links from starting page
  - has filter rules to distinguish relevant from irrelevant
- Depth-first search

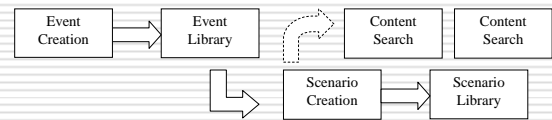


## Enriching a Scenario Context

"Gross Domestic Product rose 0.1 percent in this quarter from 1.6 percent in the previous quarter."

"Despite buoyant consumer confidence and rising demand, the worst performance for economic growth was recorded this year with the annual rate dropping from 3.0 in the last year to the current 1.5. The mixed economic data dampened current expectations, falling well short of analysts' forecast. Gross Domestic Product rose 0.1 percent in this quarter from 1.6 percent in the previous quarter. A government official commented that 'What the figures show is that the growth in demand is not being met by commensurate growth in production, but to a large extent by growth in imports and by a run down in inventories.' This is because figures also showed continued strength in domestic demand, which was up by 4.0 percent for the year."

## Stages in Scenario Generation



## Events and Scenarios in ScenGen

List of Events				
	Subject	Change/Predicate	Affected Parameter(s)	Relative Change
<input type="checkbox"/>	Oil Prices	/ positive	Emergency Transport Cost	+0.5
<input type="checkbox"/>	Purchasing Managers Index	/ positive	Unit Transport Cost In Competitor Area	-0.2
<input type="checkbox"/>	GDP Growth Rate	/ positive	Contract Size	-100.0
<input type="checkbox"/>	Index Of Severity	/ negative	Economic Index	-0.1
<input type="checkbox"/>	Exchange Rates	10.0 (dollar)	Emergency Loan	+8.0
<input type="checkbox"/>	Corporate Tax Rate	2.0 (percent) / positive	Date Market Size In Common Area	-100.0
<input type="checkbox"/>			Orders Received	-0.4

List of Scenarios	
Scenario Name	Description
<input type="checkbox"/> Oil and Purchasing Managers' Index scenario	Oil prices are increased to an all time high of US\$60/barrel. Separately, the purchasing managers' index locks set to increase.
<input type="checkbox"/> GDP scenario	GDP growth rate increased by a lower than expected 4 percent, government officials announced.

## Building up a Scenario

Selected Resource Query in "Purchasing Managers Index Oil Prices"

**Resource Description:**  
Singapore shares closed 0.15 percent higher on Thursday as technology stocks capped the market's gains. The Straits Times Index (STI) gained 3.12 points to 2,142.36 and the All-Share Equities Index added 1.26 points to 553.79. Volume totaled 860 million shares worth \$50 million (Singapore dollars) (S\$ million) (US\$), from 722 million shares worth \$51 million on Wednesday. There were 213 rising stocks, 194 losers and 484 stocks were steady. The STI continues to outpace gains on selective buying in blue chips, especially in bank stocks, a dealer at a local brokerage said. However, he said concerns over the economic impact of surging oil prices, which rose to four-month highs in New York Wednesday, could dampen investor sentiment. Singapore shares, whose average could be affected by continued high oil prices, was flat at 12.30 Singapore dollars. Among other blue chips, Singapore Telecommunications was one Singapore stock higher at 2.65 Singapore dollars, shipping firm Harland China Lines (HCL) rose 14 cents to 2.90 dollar and ST Engineering was steady at 2.37. Dealers said HCL shares were being stepped up ahead of the company's plans to expand operations with a newly ordered vessel after the last two months after 258 million profit rose to a record 563 million US dollars. In the banking sector, Overseas-Chinese Banking Corp. was 10 cents up at 13.20 when GDP and total Chinese Bank was flat at 15.10 and 13.30 respectively.

**Event Description(s):**  
Factory orders are increasing and should continue their surge in the next two quarters.  
Oil prices increased by 6.0 dollars in the previous quarter.

**Scenario Description:**  
Singapore shares prices closed 0.15 percent higher on Thursday as increase in technology stocks capped the market's gains, dealers said. The Straits Times Index (STI) gained 3.12 points to 2,142.36 and the All-Share Equities Index added 1.26 points to 553.79. Volume totaled 860 million shares worth \$50 million (Singapore dollars) (S\$ million) (US\$), from 722 million shares worth \$51 million on Wednesday. There were 213 rising stocks, 194 losers and 484 stocks were steady. The STI continues to outpace gains on selective buying in blue chips, especially in bank stocks, a dealer at a local brokerage said. However, he said concerns over the economic impact of surging oil prices, which rose to four-month highs in New York Wednesday, could dampen investor sentiment.