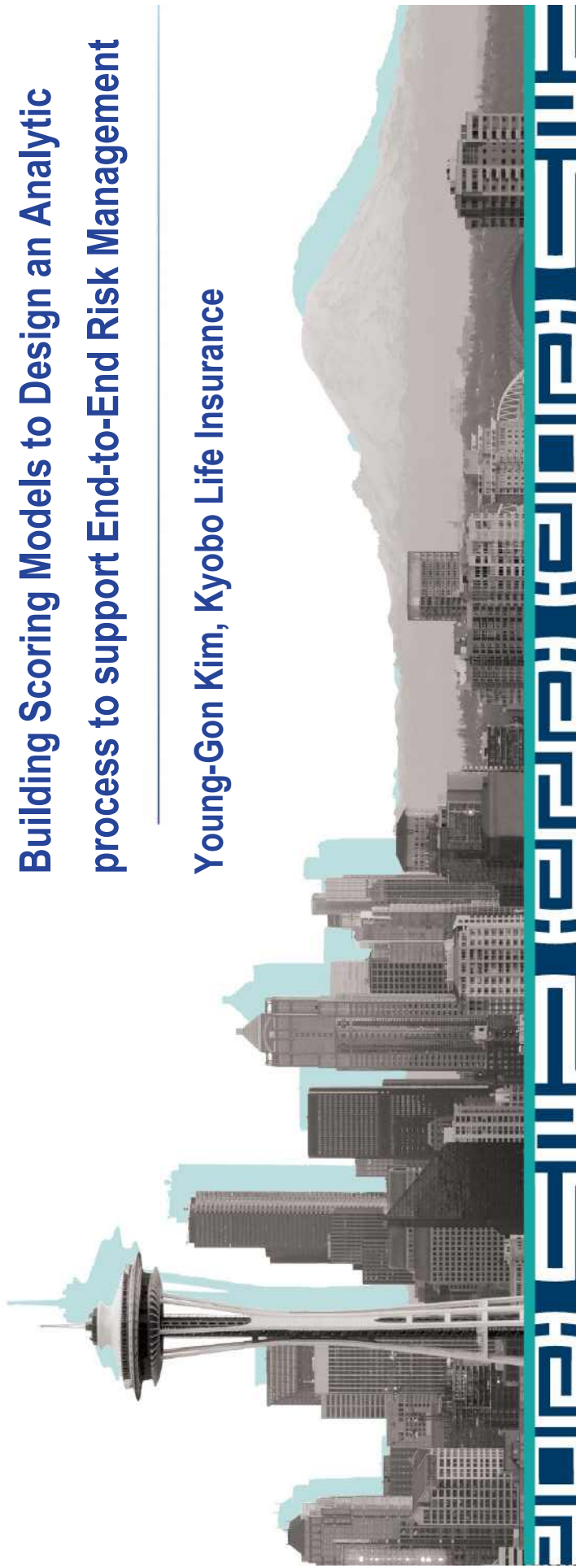




Case Study: KYOBO Life KIROS Project
Building Scoring Models to Design an Analytic
process to support End-to-End Risk Management

Young-Gon Kim, Kyobo Life Insurance



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- 1. Company Profile**
- 2. Project Overview**
- 3. KIROS Architecture**
- 4. KIROS Details**
- 5. Characteristics of the KIROS System**
- 6. Key Business Benefits : ROI**





About Kyobo Life (1/2)

1. Company Profile

Vision



Core Purpose

Our mission is to help people not to despair with hardships in their lives.

Core Value

Customer-Friendly Orientation



Vision 2010

The most preferred life insurance company in the domestic market.

(The Customer's Most Preferred Brand)

Customer-Friendly Orientation

Our valued customers best interests are always our top priority.

Honesty and Sincerity

We are fully accountable, and always endeavor to serve our customers honestly and sincerely.

Spirit of Challenge

We strive continuously to attain the high performance goals for the domestic and overseas.





About Kyobo Life (2/2)

1. Company Profile

- August 7, 1958 : Established
- June 27, 1983 : Founder Yong-Ho Shin receives Founder's Award from the International Insurance Society(IIS)
- July 8, 1996 : Founder become a Laureate of the Insurance Hall of Fame by the IIA
- June 30, 2008 : Rated A2 by Moody's Investors Service and AAA by NICE Investors Service in Insurer Financial Strength Rating
- November 9, 2009 : Life Insurance Company of the Year at the 2009 Awarded by Asia Insurance Industry Awards(AIIA)
- One of Big 3 players dominating Korean life insurance industry
 - The Big 3 players Dominating Market share is 55.2% (FY2008, Premium Income)
- Kyobo Life will grow to a 100-year old company beyond the past 50 years that it has been built on love and trust of the customers -4-



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1. **Company Profile**
2. **Project Overview**
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4. **KIROS Details**
5. **Characteristics of the KIROS System**
6. **Key Business Benefits : ROI**





Project Objectives

2. Project Overview

External

- (2008) Financial crisis continues to regress long-term economic outlook.
- Actively prepare countermeasures against increasing insurance fraud and adverse-selection activities.
- Insurance fraud efforts are becoming more organized and intelligent.

Internal

- Since 2006 profits from new contracts have improved a great deal, but overall profit from contracts declining.
- Importance of measuring insurance risk of current effective contracts has emerged due to increase of claim amount from survival benefits and reduction of the scale of unjust claim prevention amounts.

An advanced structure in insurance risk management

- Sophisticated risk assessment
 - Underwriting & claim adjudication differentiation

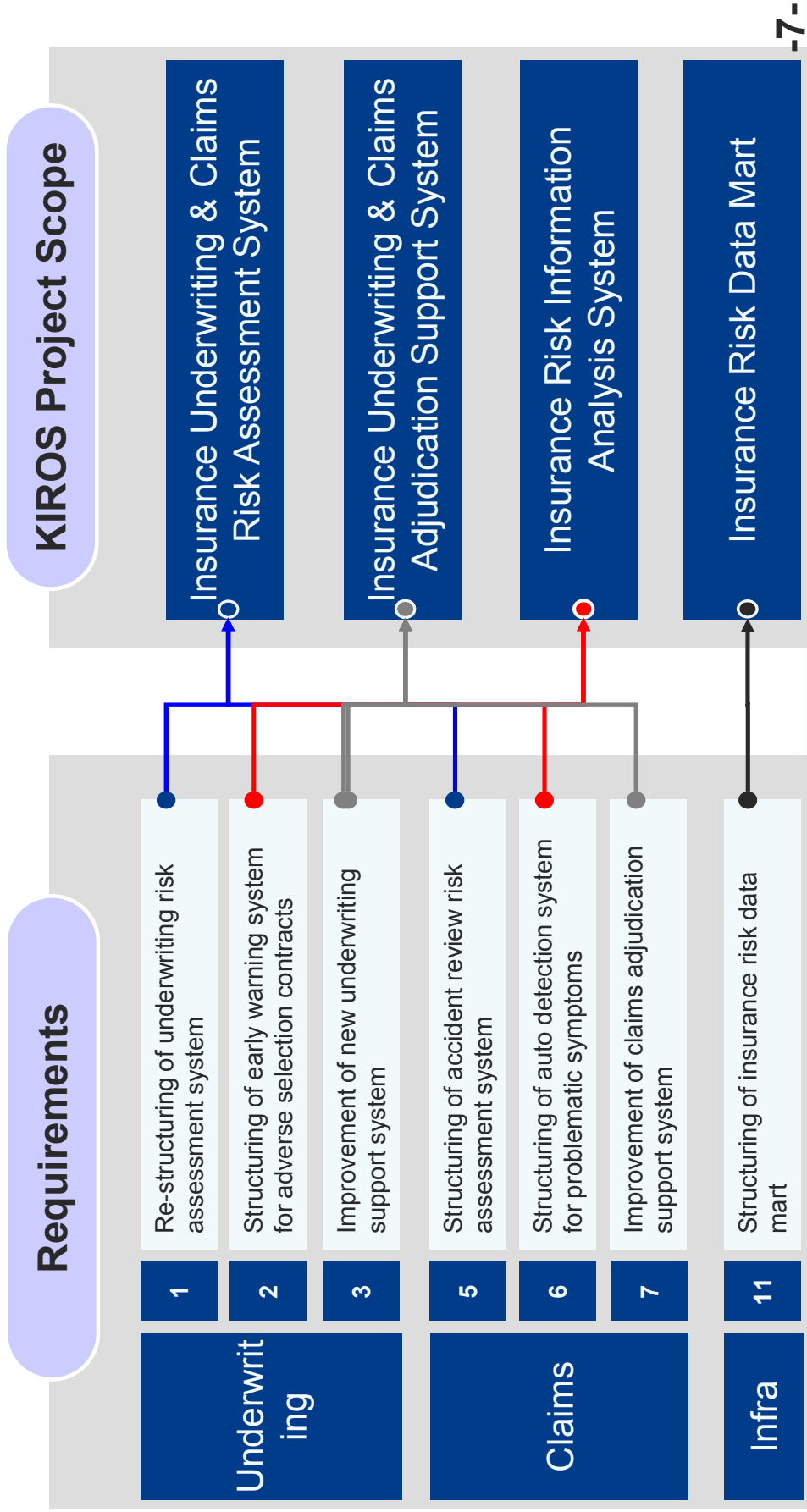




Project Scope

2. Project Overview

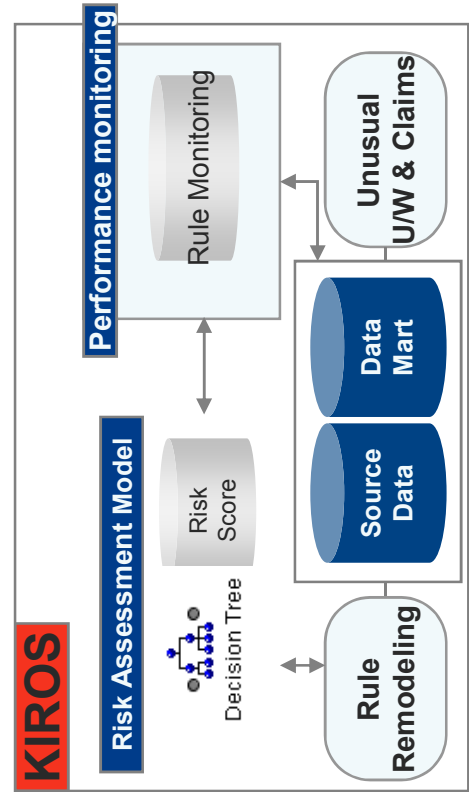
The KIROS system is the first in the insurance market to integrate new contract and claims adjudication processes.





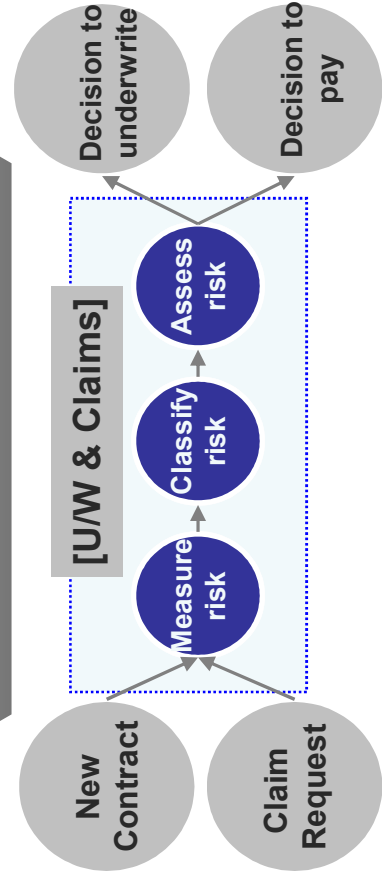
KIROS Conceptual Image

2. Project Overview



KIROS independent system

- Risk assessment for customers based on the insurance risk data mart
- Performance monitoring and remodeling of risk assessment model
- Definition of unusual and irregular underwriting and claim requests and multi-dimensional analysis



KIROS system utilization

- Decisions to underwrite or pay are supported through the measurement, classification and assessment for new contracts and claims requests





Project Resources & Period

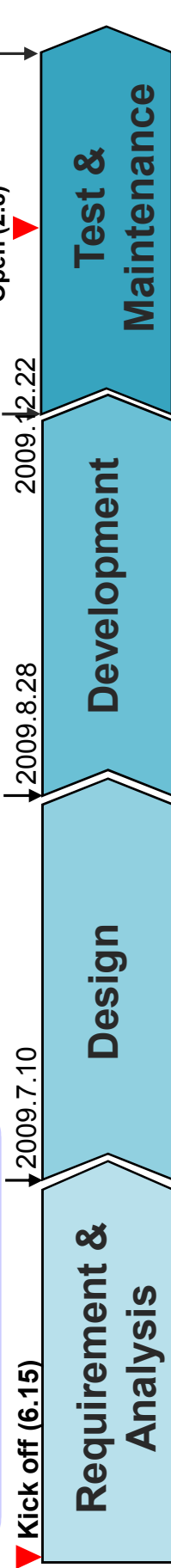
2. Project Overview

Resources

9 months, 258 MM (SAS Korea 148 MM, Risk Scoring using SAS FDS Solution)

KICO (Kyobo Subsidiary) (110 MM, Underwriting/Claim System Renewal)

Project Period



■ KIROS S/C approved each phase of the project

Final report of analysis phase

Final report of design phase

Intermediary report for development phase

Report of operation and final completion



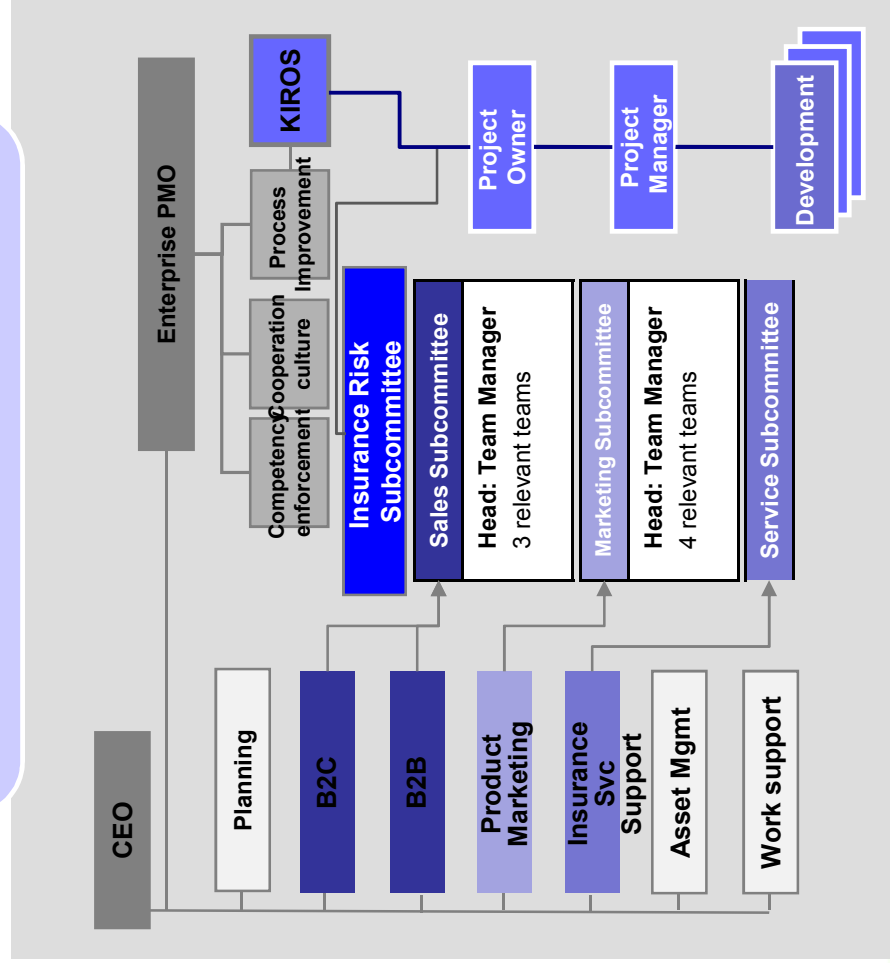


Communication Governance

2. Project Overview

Full support of an enterprise wide project for KIROS from the head office to the work site.

KIROS Project Organization



Insurance risk sub-committee council

Role	<ul style="list-style-type: none"> • Communication with relevant dept of head office and sales site • Formulation of user development requirements and deriving utilization using KIROS
Duties	<ul style="list-style-type: none"> • Implement FGI 4 times for each class of sales site • Collection of user requirements for head office (3 times per week) • Review of system design • Review and decision-making for matters undertaken in each project phase



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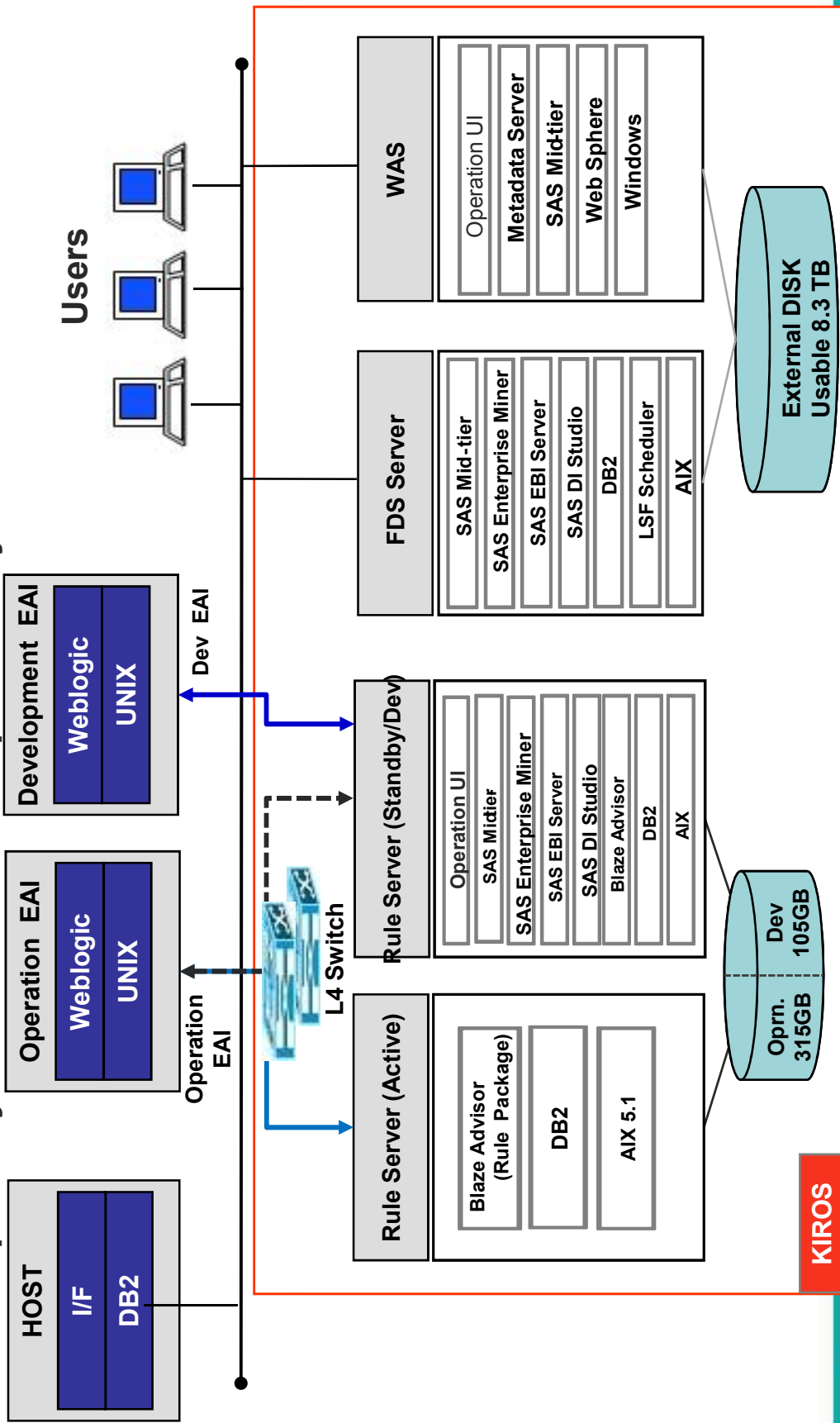




KIROS Configuration

3. KIROS Architecture

Secure flexibility by building a next-generation system by implementing KIROS separately from the current operation system.



KIROS





KIROS Development using SAS Solution

3. KIROS Architecture

SAS Product Applications

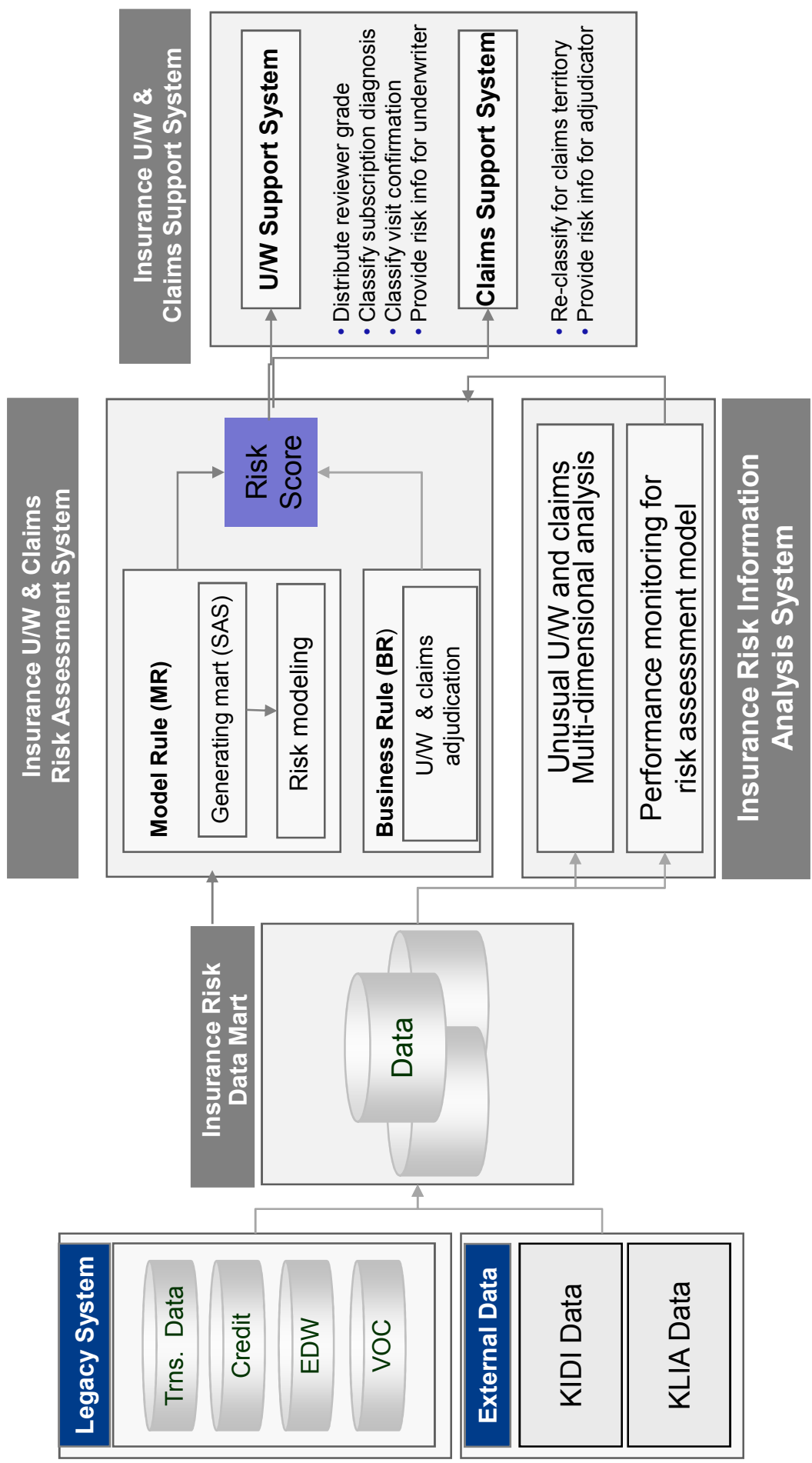
Applicable Technology	Manufacturer	Facilitation
SAS Base (9.1)	SAS	<ul style="list-style-type: none"> Data handling for generating the model rule Generate data for multi-dimensional analysis and defining unusual underwritings and claims request standards
SAS Enterprise Miner	SAS	<ul style="list-style-type: none"> Execute models <ul style="list-style-type: none"> - Underwritings: 18 models, 453 node(rules) - Claims: 12 models, 175 node(rules)
SAS DI Studio	SAS	<ul style="list-style-type: none"> Extract data from raw data, host and EDW and load Generate data marts for U/W, claims, SIU, etc. Deliver daily batch results and customer/contract info to rule server
SAS Mid-tier Metadata Server	SAS	<ul style="list-style-type: none"> SAS Portal (KIROS Portal) including multi-dimensional analysis, Early warning system, Performance monitoring, Rule refinement (remodeling), Rule management system (for MR/BR)
Blaze Advisor	FICO	<ul style="list-style-type: none"> Load the results of SAS MR Operation of overall rules Interaction with the current operation system (host)





Application Architecture

3. KIROS Architecture



▪ KIDI : Korea Insurance Development Institute, KLIA : Korea Life Insurance Association



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Insurance U/W & Claims Risk Assessment System (1/5)

4. KIROS Details

KIROS implemented to strengthen the support of risk assessment of insured clients.

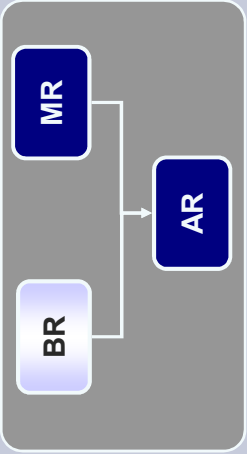
As-Is

- Standard Risk Assessment Process
 - Based on past experience criteria
 - Occupation group, age, rule of the insurance amount etc.
- Reflecting limited risk assessment factors
 - Risk assessment for combinations of risk factors (occupation, age, cause of claim, claim amount, etc)
- Insufficient performance measurement
 - Impossible to determine the appropriateness of risk assessment based on standard application

To-Be

- Risk Assessment method applying risk assessment model
 - Scoring for insured clients' risk size using risk assessment MR
 - Link adjudicator's experience with historical data

The risk assessment model



- Regular performance review for risk assessment
 - Supports the adaptability and consistency of risk assessment model through performance review for the operating rule



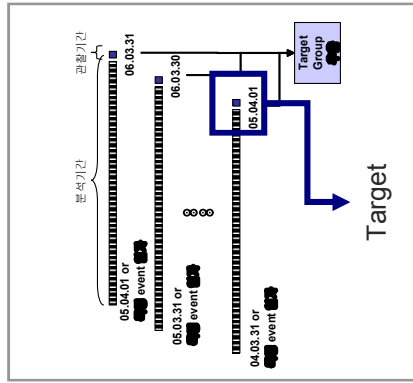


Insurance U/W & Claims Risk Assessment System (3/5)

4. KIROS Details

The modeling process for using SAS E-Miner

1. Definition of Target



- Select target for major analysis of activity territory or subjects to improve

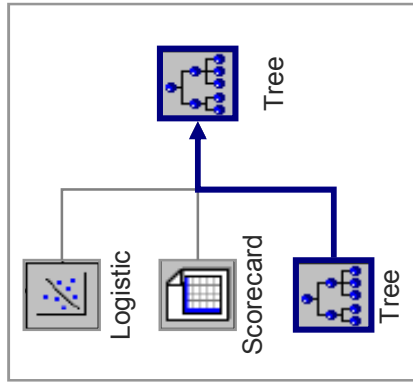
Target of the underwriting model :

- . Risk benefit rate

Target of the claim model :

- . Exemption rate

2. Definition of Modeling Technique

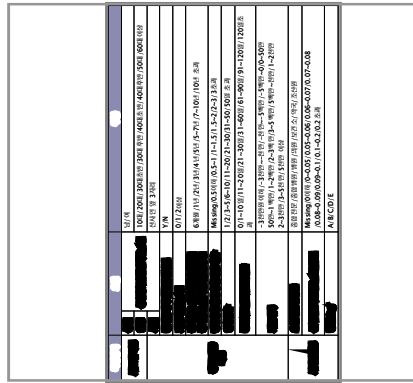


- Decision of modeling technique

- Finalize modeling technique on sufficient understanding of underwriter/adjustor

- **Decision Tree Modeling method**

3. Definition of Applicable Variables



- Definition of all variables following the hypothesis expected to influence the target of the model

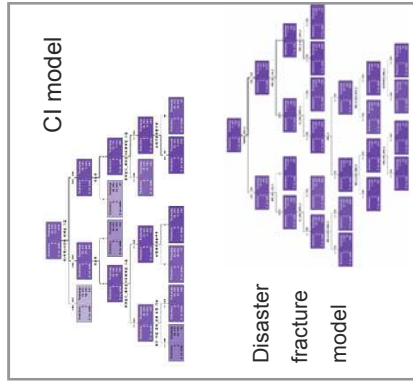
- Primary factor: raw data

- Derivative variables:

- . summary factor

- . total insurance amount,

4. Realization of Detailed Model



- Segmentation of model for each territory ✕ Participation of reviewer (1st In the Industry)

- Detailed model: Realize the model by considering client characteristics and level of diagnosis per special contract/benefit





Insurance U/W & Claims Risk Assessment System (2/5)

4. KIROS Details



Model that is standardized by reflecting the insurance risk management policy of the company, and other policies

(Example)

- People over 50 years of age must receive medical diagnosis
- Occupational drivers are not allowed issuance of accident insurance

Model that is standardized for similar cases to insure risk management by utilizing the experimental data of the company

(Example)

- Standardization of payment cases with a high exemption rate

Model that is standardized for high significant score from the AR is used for company's policy Regulation and processing

※ Reflecting the expertise of the underwriter and claims adjudicator

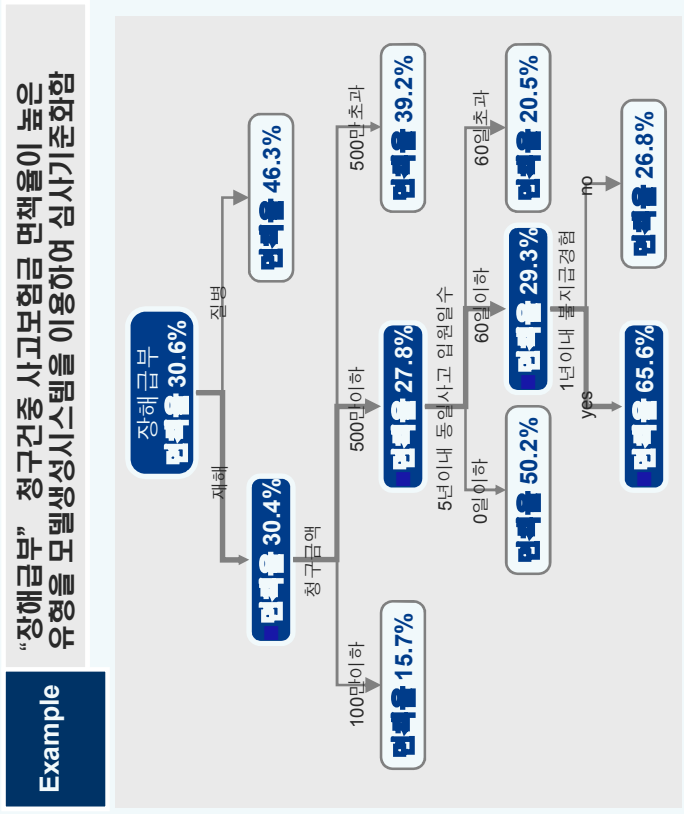




Insurance U/W & Claims Risk Assessment System (4/5)

4. KIROS Details

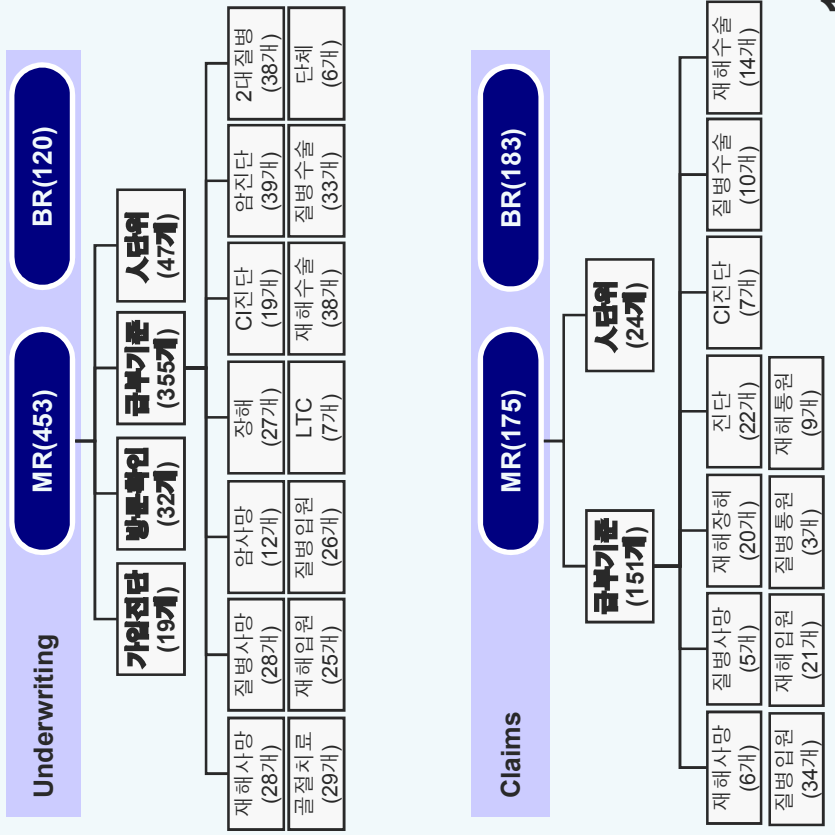
Example of MR Generation



순번	보험심사 기준	직전 1년 실적	
		심사건	면책건
MR_1	동일사고 5년간 입원일수 0일 초과 60일 이하건 & 기동일사고 1년간 불지급경험 존재건 & 교통재해 정해청구 100만 초과 500만 이하 청구건	55	40
MR_2	동일사고 5년간 입원일수 없음건 & 5년간 청구건수 0 초과건 & 교통재해 정해청구 100만 초과 500만 이하 청구건	143	85
MR_3	동일사고 5년간 입원일수 없음건 & 교통재해 정해청구 500만 초과 청구건	164	95

Status of MR and BR Development

The risk assessment model is a combination of “**Experience statistics + Underwriter expertise**”

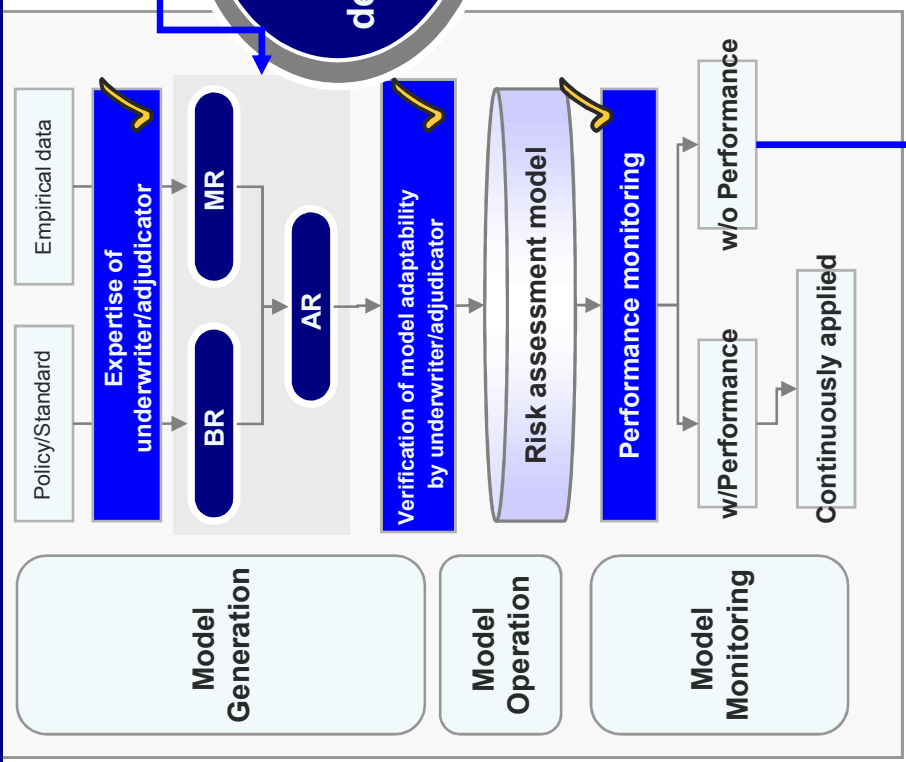




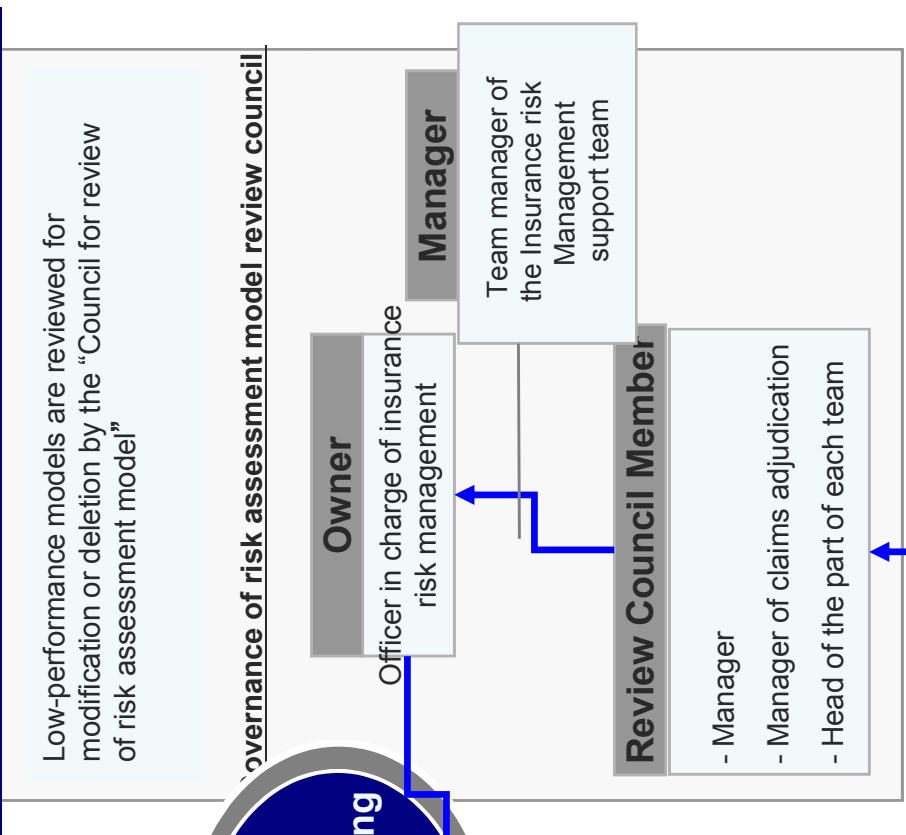
Insurance U/W & Claims Risk Assessment System (5/5)

4. KIROS Details

Operation process of risk assessment model for insurance review



Performance monitoring for risk assessment model





Insurance U/W & Claims Support System - Underwriting

4. KIROS Details

Classification according to the size of the risk scored by the risk assessment model (MR, BR, AR)

As-Is

- Applying the limited risk assessment category

30 risk factors
(occupation, age, etc)



10 subject benefits
(death, disability, hospitalization, etc)

- Difficult to reflect new products and new benefits

- Limited utilization of risk assessment results

Result of risk assessment
(risk score)

Limited to distribution for each grade

To-Be

- Applying the segmentation of the risk assessment category

Risk assessment category

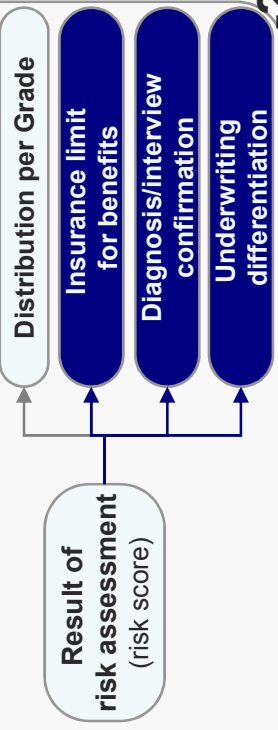
600 risk factors
(risk information pool)



14 subject benefits
(existing + CI, surgery and others)

- Secure consistency through sophisticated underwriting process
- Classify Customer segmentation through the risk assessment category

- Applying the risk assessment results to the underwriting process





Insurance U/W & Claims Support System - Underwriting

4. KIROS Details

To-Be

모델 별 score 상세

위험평가

1	재해사망	발생사망	암사망	장해	CI	임진단	2차발병진단
SCORE	20.85	21.41	16.57	19.01	19.73	14.28	15.48
금부영	결함추보	재해인원	결함인원	LTC	재해수출	결함수출	
SCORE	20.46	28.98	22.75	13.78	38.59	19.91	

진단작출

2	인신제
SCORE	19.23

면담역력

3	인신제
SCORE	14.66

Rule Trace

번호	룰아이디	설명
4	UB2019903000001X	기본값
	UB2019904000001X	불량자역구분 기본값
	UB2019904000002X	불량자역산출여부 초기값
	UB2019905000005X	고소득 전문직 여부
	UB2019908000001X	불량자역구분 기본값
	UB2019909000002X	FP 구분
	UB201990C000001X	우수기관구분 초기화
	UB201990G000001X	제정적위험 소재자구분 초기화
	UB201990G000003X	국민건강보험공단진료내역구분 초기화
	UB201990H000001X	처음적응구분산출
	UM1010001001008G	
	UB3019902000001X	피보험자 진단여부 초기화(N)
	UM2010001001005G	
	UB40199040000030	내부적외계약
	UB40199040000050	6개월 미경과 지적부 확인계약 (조건 확인 필요)

Screen Explanation

Inquiry regarding contents for risk assessment results.

Providing major categories to support the underwritings process:

- 1 Payment case for each person
- 2 Diagnostic score
- 3 Interview score
- 4 Applied MR case





Insurance U/W & Claims Support System - Claims

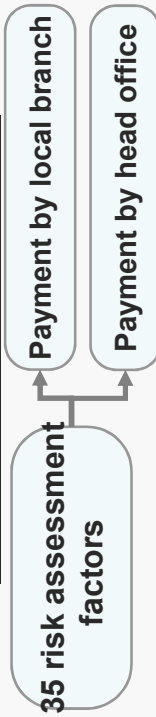
4. KIROS Details

The claims support system improves the appropriateness and efficiency of adjudication by utilizing risk assessment results for adjudication relocation and specific information about claims requests.

As-Is

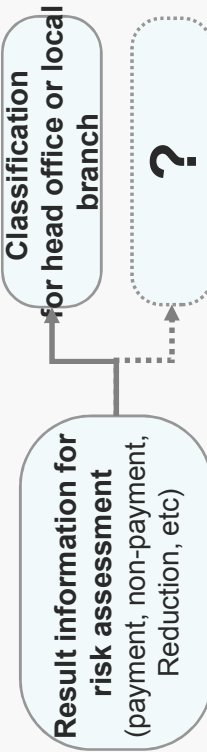
- Risk classification method based on simple standards and adjudicators' expertise

Risk classification method



- Difficulty in utilizing various information on the result of the risk assessment for claims

Utilization of risk assessment result



To-Be

- Risk classification method by the risk assessment model (score) that reflects various risk factors

Risk assessment model



➤ Improve adaptability of adjudication after reviewing various risk information

- Utilize the risk assessment result for claims adjudication

Result of risk assessment (Scored for each person)





Insurance U/W & Claims Support System - Claims

4. KIROS Details

To-Be

The screenshot displays the KIROS system interface with several key components:

- Client Information:** Includes fields for name (김수현), ID (201010200007), and other personal details.
- Policy Details:** A table listing policies with columns for policy number, date, and status.
- Payment Case Details:** A table showing payment cases with columns for case number, date, and amount.
- AR Score:** A section displaying the Adjusted Risk Score (AR Score) for the client.

Screen Explanation

Inquiry regarding contents of risk assessment results.

- Provide details on risk assessment for each contract
- Claims adjudicator confirms the risk factor for individual reviews in detail
- Determines adjudication decision

- 1 Client score**
- 2 Insurance policy score**
- 3 Payment case score**
- 4 AR Score**





Insurance Risk Information Analysis System

4. KIROS Details

SAS Web Portal

Scope of Work

The screenshot displays the KIROS web portal with a navigation menu on the left and a main content area. The main content area is divided into several sections:

- 이상징후 자동검출** (Abnormal Sign Automatic Detection): Lists modules like 이상징후 자동검출, 이상징후(아발)를 처리함, 이상징후(사구)발생현황, 이상징후(사구)발생현황, 이상징후(안정)를, 이상징후(안정)를, 이상징후(안정)를, 이상징후(안정)를, 이상징후(안정)를, 이상징후(안정)를, 이상징후(안정)를, 이상징후(안정)를.
- 보험 리스크 다차원분석** (Insurance Risk Multi-dimensional Analysis): Lists modules like 다차원 분석(이행)을 처리함, 다차원 분석(사구)발생현황, 다차원 분석(안정)을, 다차원 분석(안정)을, 다차원 분석(안정)을, 다차원 분석(안정)을, 다차원 분석(안정)을, 다차원 분석(안정)을.
- 모범 성과모니터링** (Model Performance Monitoring): Lists modules like 예외 확인, 모델 불 확인, 모델 불 요인 확인, 미스니스 를 확인, 연관성 를 확인.
- 모범 리모델링** (Model Remodeling): Lists modules like 모델링, 세팅이전, 적용.
- 위험평가 관리** (Risk Assessment Management): Lists modules like BR 관리, MR 관리.

Below these sections is a **공지사항** (Notice) section with a table of updates:

번호	제목	작성일
4	KIROS 시스템 오픈 안내 - KIROS 시스템이 2010. 2. 8일에 오픈됩니다. 많은 활용 바랍니다.	2010. 2. 4
3	KIROS 시스템 구축에 따른 고객 PLAZA 열리 교육 실시 - 교육일정 : 2010. 2. 2 - 2. 5. 장소 : 해당지역본부	2010. 1. 28
2	KIROS 시스템 구축에 따른 부서 사용자 교육 실시 - 교육일정 : 2010.1.26 ~ 1.27. 장소 : 본사 18층 회의실	2010. 1. 21
1	KIROS 시스템 사용자 테스트 안내 - 사극시차 : 16 ~ 115, 엔지니어링 : 1. 12 ~ 1.22	2010. 1. 4

On the right side of the screenshot, there is a **Q&A** section with a table:

번호	제목	작성일
3	시스템을 사용하다가 갑자기 정지 있을 때, 복구해 주실수 있으신가요? 백업데이터를 복구하는 것은 초보자에게는 어려운 일입니다. KIROS 시스템은 백업 데이터를 복구하는 기능이 없습니다. KIROS 시스템이 오프라인 시키면 복구 할 수 없습니다. 하지만, 백업처 검색이 가능합니다. 기존, 표준형의 시스템은 입력데이터, 오동부(는 hospitalization)인, 수송일지, diagnosis일별로, 특정이 다를 경우 각각의 치료내역별로 의사정보를 입력해야 합니다.	2010. 2. 8
1	KIROS가 부임을 지원하는 용어인가? 답변 : KIROS시스템은 Sobob Insurance Risk Management Operation Supporting system의 initial을 포함한 용어이며, 우리회사의 보험리스크관리를 위한 운영지원시스템을 의미합니다.	2010. 2. 8

- Unusual and irregular underwriting and claims for Fraud (Early Warning System)
- Multi-dimensional Analysis
- Performance Monitoring for Rules
- Rule Refinement (remodeling) system for operation rules
- Rule Management System





Insurance Risk Information Analysis System

4. KIROS Details

> Gather users' business requirement for rules

Gathering Requirement

Rule Management Process

> Execute rule refinement for lower performance

Rule Refinement (Remodeling)

> Generate and apply the model rule

Modeling

> Monitor the performance of the model rule

Monitoring



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Characteristics of KIROS System



5. Characteristics of KIROS System

Key Challenges

- Lack of accuracy regarding risk factor
 - Undertake data cleansing within the project period
 - > Segmentation of cases of exemptions granted (09.5.18 ~ present) : 37,000
 - > DB for exemption point of right to investigate: 8,000.
 - > Hospital/doctor data cleansing : 45,000
- Guarantee of user response time for different models
 - Secure online response of 1 second for accounts
- Performance rate of MR/BR rule test
 - Carry out 55.6% prior to opening

Factors leading to Success

- Full-support of executives, including CEO
- Participation of users consisting of specialists in each field
 - Competent Staff
 - Excellent Financial data handling
 - Excellent Insurance Risk Modeler
- Proper Project planning
 - On time delivery(9Months)
 - Resources(257MM)
- Using SAS' worldwide FDS Framework
- Excellent business domain knowledge gained through continuous insurance project (Korea Big companies)
- Strong Project Management skills
- Effective monitoring and improvement on performance
- Strong support from SASK for completion of the project



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6. Key Business Benefits : ROI





Key Business Benefits : ROI

6. Key Business Benefits: ROI

Quantitative effect

Expected goal when reporting for KIROS approval (Jun. 2009)

Underwritings

Expect to eliminate a possible future loss of 1.3 billion KRW + α (through preliminary removal of adverse selection contracts)

Claims

Expect to save additional claim denial (exemption) amounts by 3.8 billion KRW + α

Scheduled to report the KIROS Performance measurement (Sep. 2010)

※ Implement post-performance evaluation for Apr. ~ Sep. 2010 (6 months) after the system stabilization phase

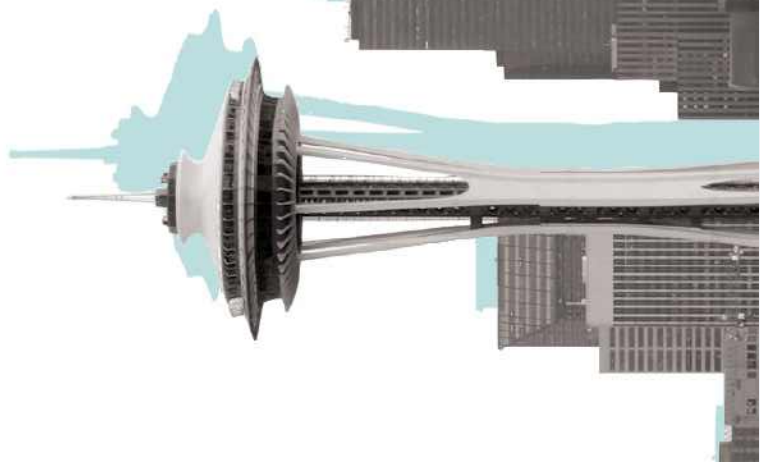
Qualitative effect

- Enhance the accuracy of “risk assessment of insured,” a critical part of insurance risk management
- Enable a prompt response to various insurance fraud patterns through the development of the risk assessment method
- Support for timely insurance risk management policy by improving the management of the insurance risk data
- Enhance external recognition by implementing the first integrated insurance risk management system in the insurance industry (underwriting + claims)





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