



GOVERNMENT OF
MONGOLIA

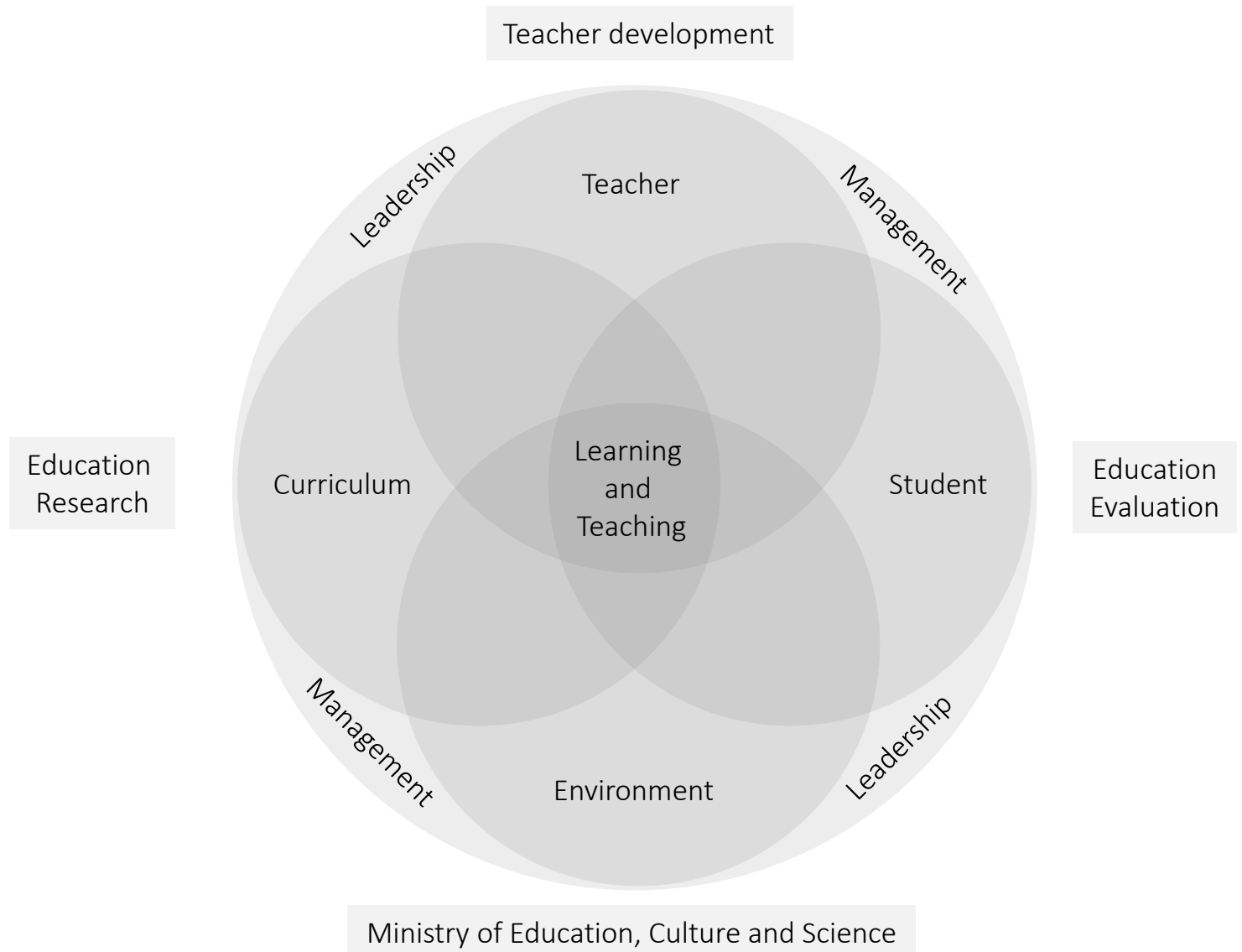
MINISTRY OF EDUCATION,
CULTURE AND SCIENCE

ENABLING EVIDENCE BASED EDUCATION ECOSYSTEM

Real-time education ecosystem implementation
Mongolian case

Education ecosystem framework

- Leadership
- Management
- Curriculum
- Teacher
- Environment
- Student
- Cooperation
 - Ministry of Education
 - Education research
 - Teacher development
 - Education Evaluation



What is the education business?
How does it run?

Manage Education ecosystem

Input

Strategy

- Evidence based Strategy development
- Planning, budgeting, forecasting

Management

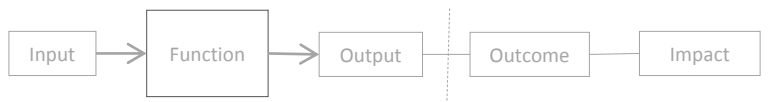
- Human resource /Institutional capacity building/
- Financial

Learning and Teaching /Real-time data analysis/

- Curriculum
- Application and Admission
- Student administration
- Grading

Assessment /Evidence based feedbacks to every school, teacher and student/

Education Research



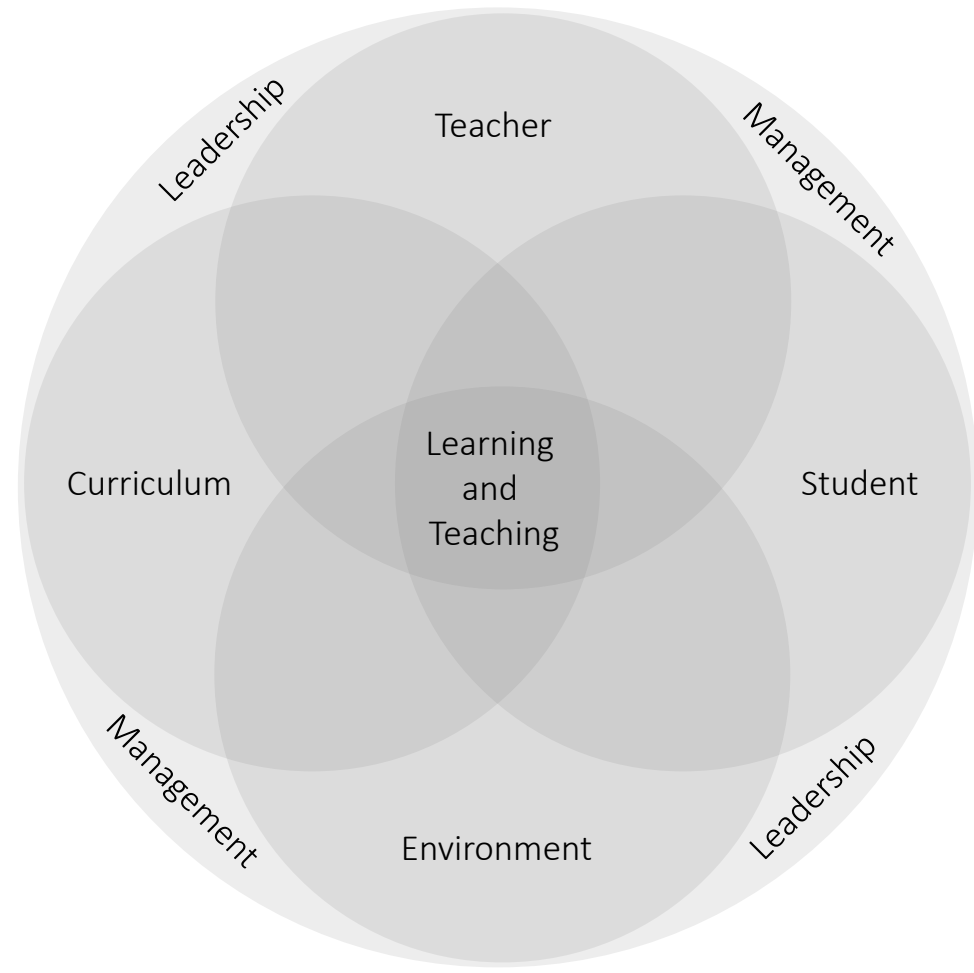
Primary education program

Lower secondary education program

Upper secondary education program

Function

Teacher development



Output

Education Evaluation

Ministry of Education, Culture and Science

Information systems

Educational management			Human capital management			Financial management			
Curriculum management	Student Administration	Application and Admission	Core HR	Time and Labor	Absence management	Strategy management	Planning, budgeting & forecasting	Cost management	
Grading and Advising	Progression and Graduation	E-Learning management	Workforce compensation	Benefit management	Payroll	Investment and Construction	Maintenance and Repair	Invoice management	
Assessment management	Teaching and Learning service	Study Analysis	Learning and Development	Performance and Succession	Recruiting and Onboarding	Receivable management	Travel management	Financial close	
Timetable management	Fee management	Educational Analytics	Talent Review	Workforce Planning	Workforce Analytics	Project management	Procurement	Financial analytics	
Information & Integration management			Testing and Learning management			Social & Collaboration management			
Statistics management	Data warehouse (OLAP)	Business intelligence	Course management	Online course	Virtual class	Messenger	Collaboration	Information feeds	
Content management	Master Data management	Data Quality	Certificate	Mobile learning	Content	Portal	Sites	Document Sharing	
Data integration	Service integration	Service management	Testing management	Test database	Testing device integration	Stream	Content management	Mobile chatting	
Information & Service analysis			Testing & Learning analytics			Social analytics			
Governance, Risk & Compliance		Cloud control	Cloud control	Enterprise management	Access Governance	Audit Management	Controls and Compliance	Risk management	Fraud management

Information systems

Educational management			Human capital management			Financial management			
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Information & Service analysis			Testing & Learning analytics			Social analytics			
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Education Sector Information System Project

- Goal

Education sector information systems of development, pilot, implementation, sustainability

- Scope

- Develop 250+ modules

- Time

3 years (2013/7-2016/12)

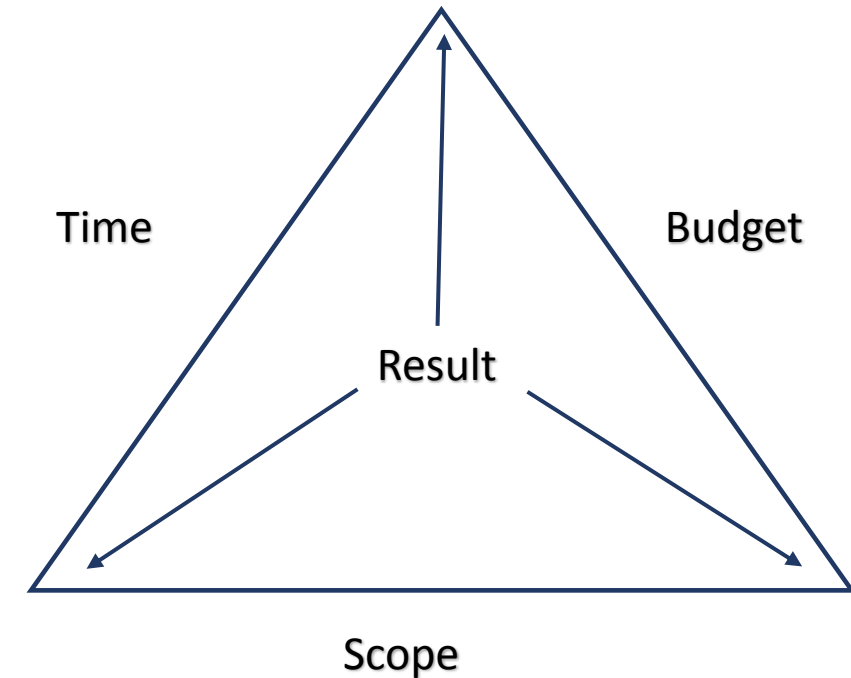
- Budget

State budget, Asian development bank

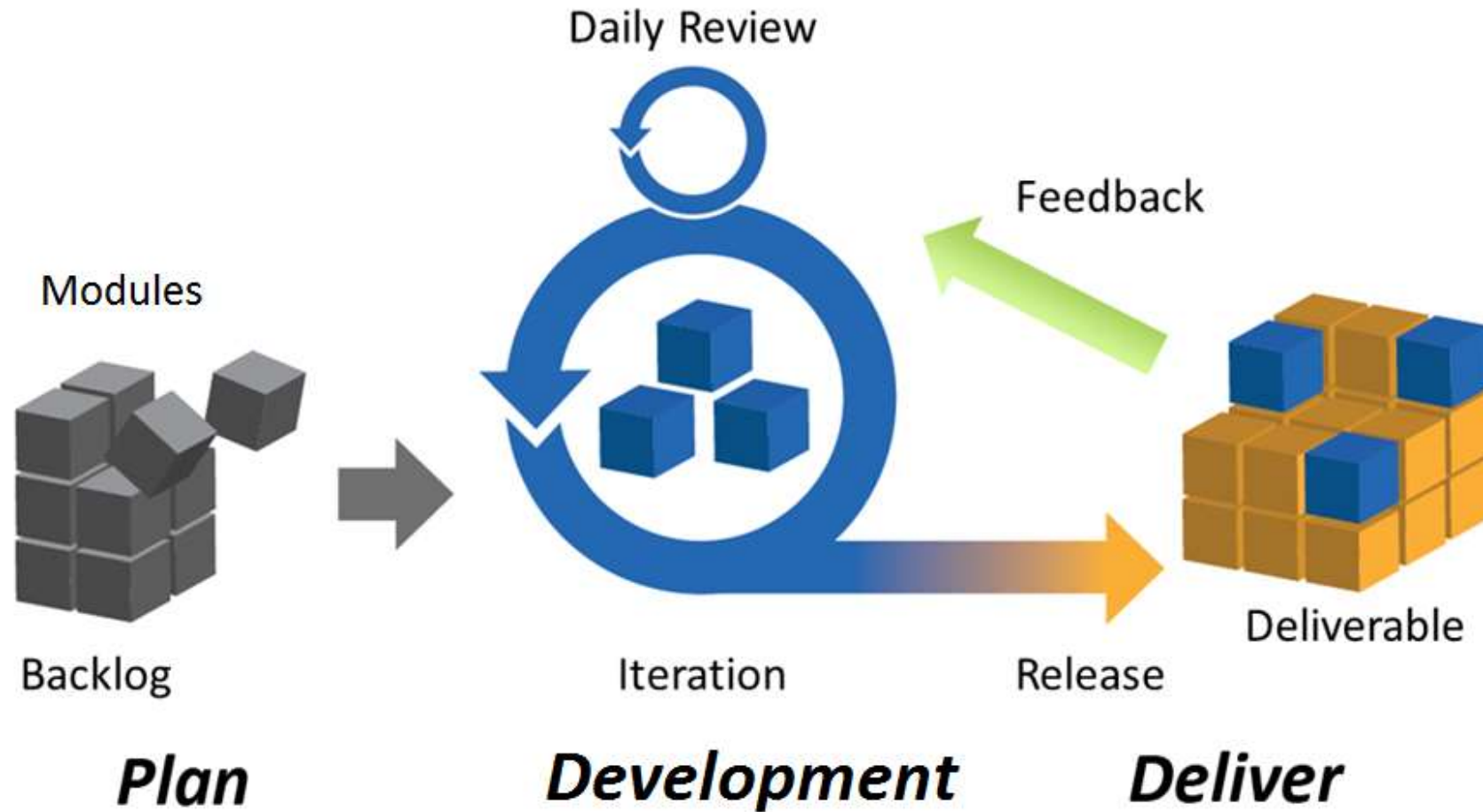
- Team

25 people (Manager and architect-1, Business analyst -7, System analyst-4, System developer-10, IT engineer -2, Designer -1)

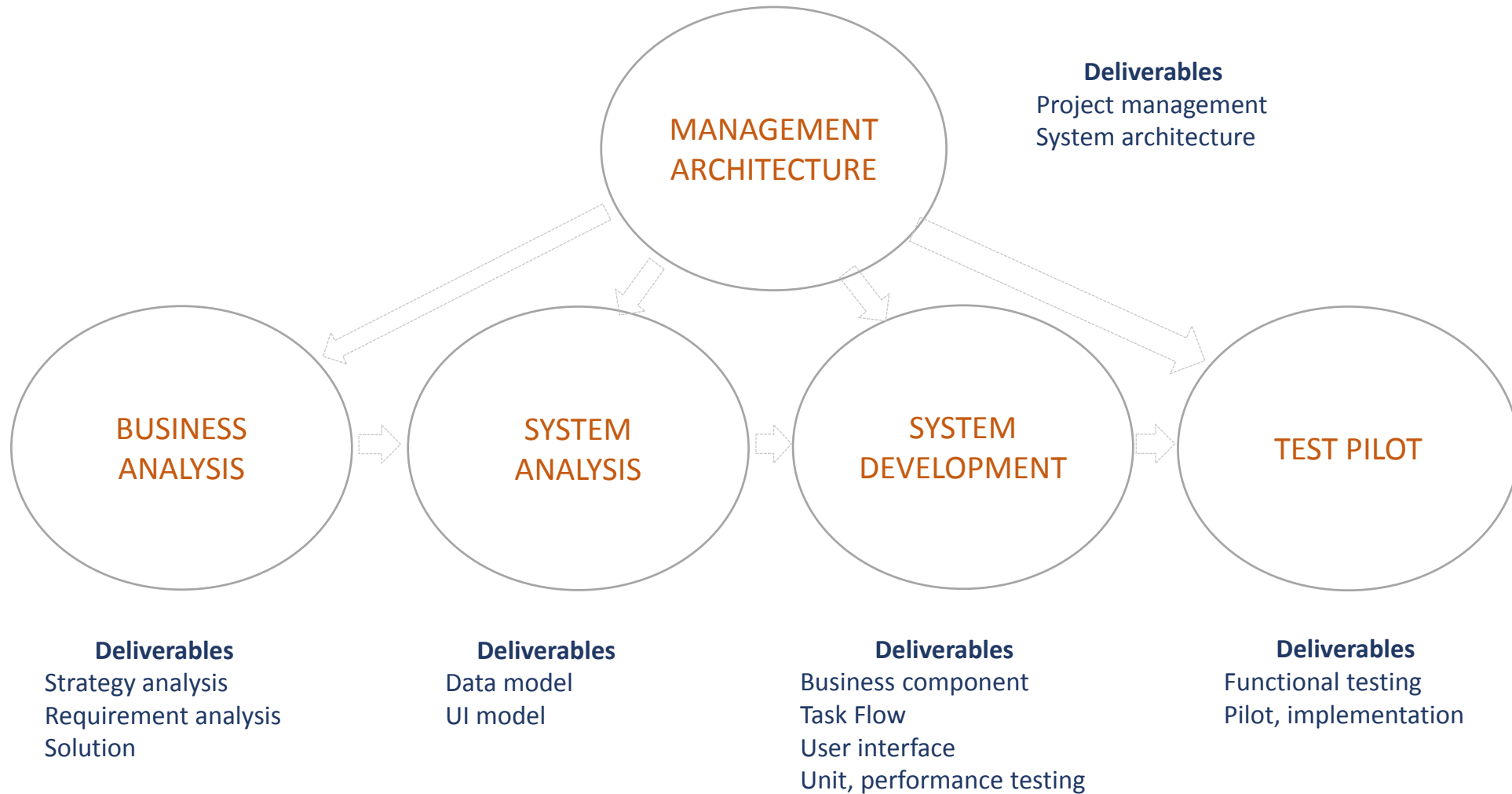
Development: **In-house**



Project management: Agile



Development process



Business analysis

Guide

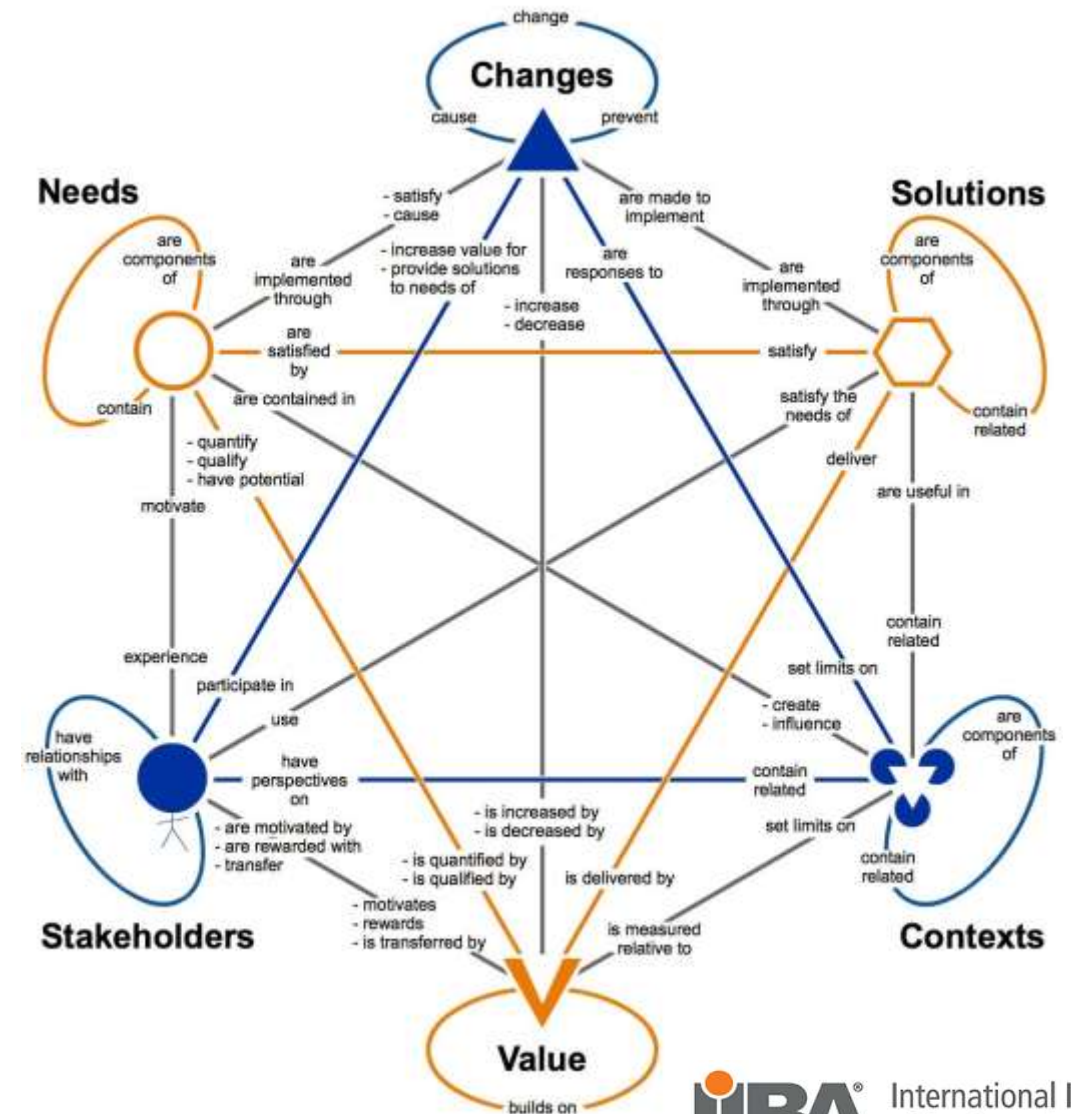
Strategy analysis

Requirement analysis

Solution

A Guide to the business analysis Body of Knowledge

- Strategy analysis
 - Current state
 - Future state
 - Change strategy
- Requirement analysis
 - Requirement
 - Define Design
- Solution, evaluation
 - Simple solution
 - Evaluation



Business analysis

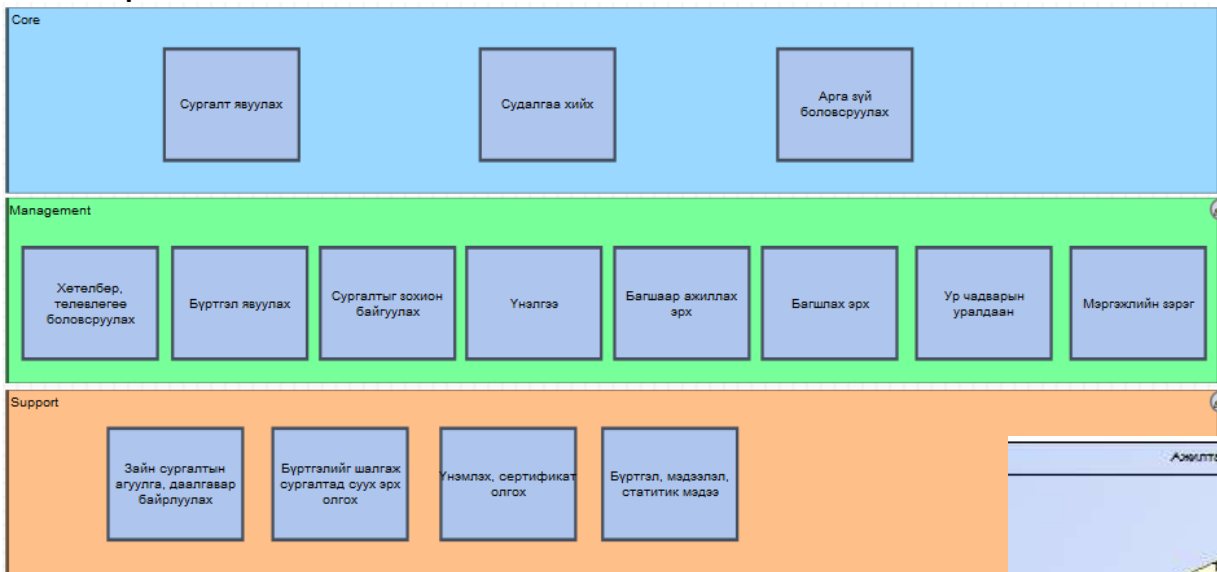
Guide

Strategy analysis

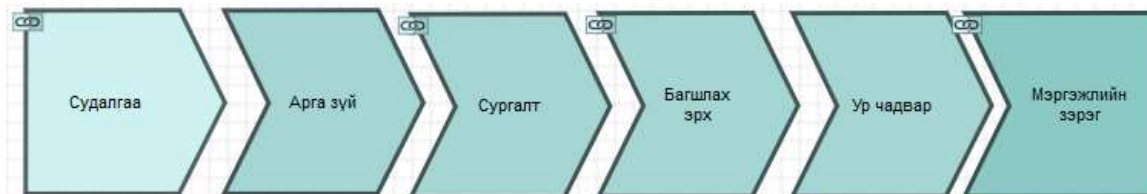
Requirement analysis

Solution

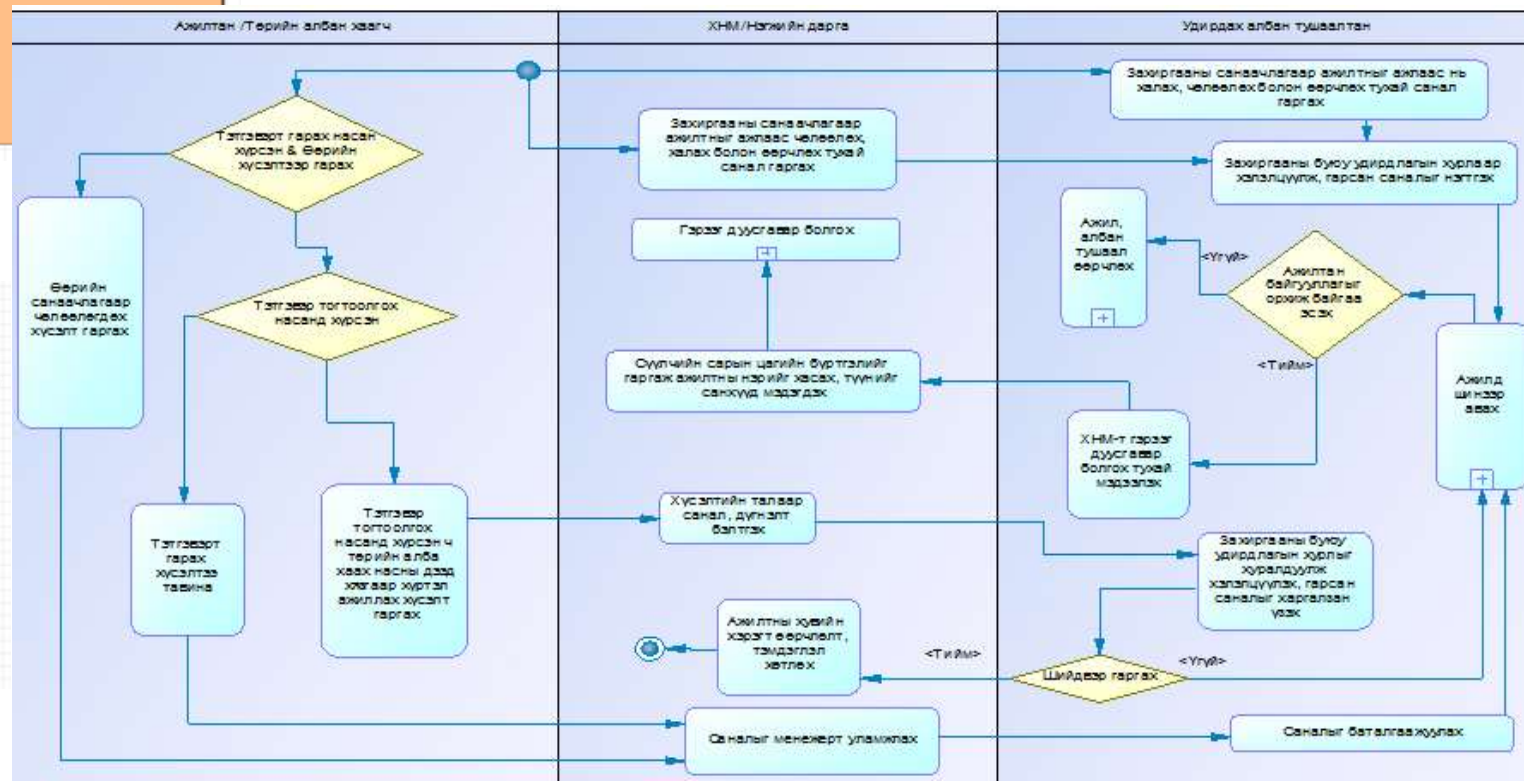
Enterprise architecture



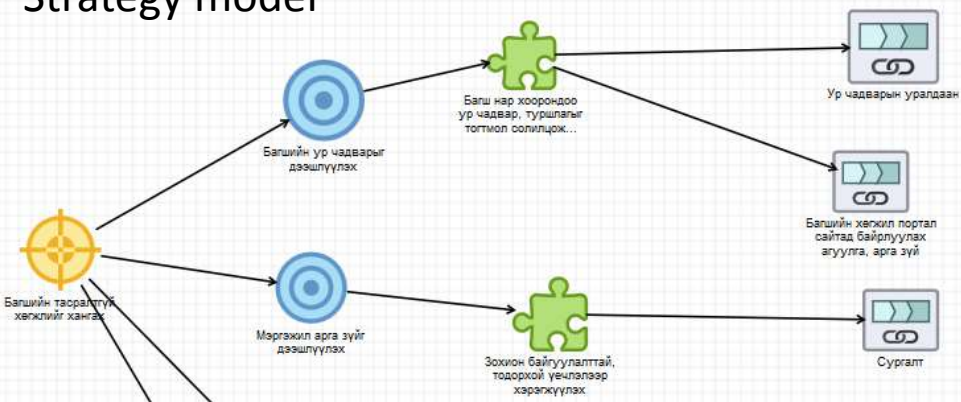
Value chain



Business process



Strategy model

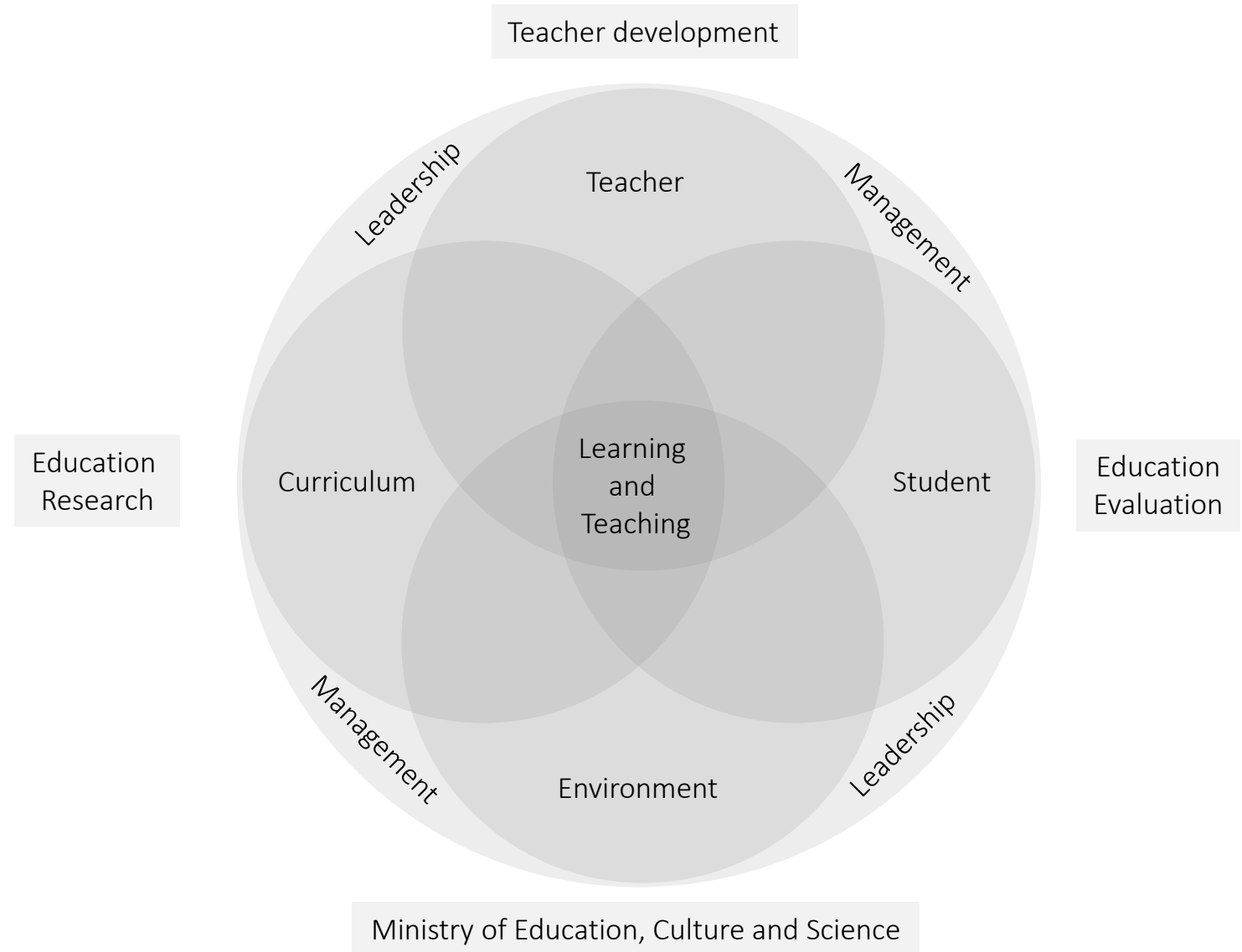


Business analysis



Strategy analysis

- From top-down: a strategic goal
- From bottom-up: a problem with the current state of a process, function or system
- From middle management: Manager needs
- From external drivers: Customer demand



Business analysis

Guide

Strategy analysis

Requirement analysis

Solution

- Requirements analysis
- Design Definition

School

School performance

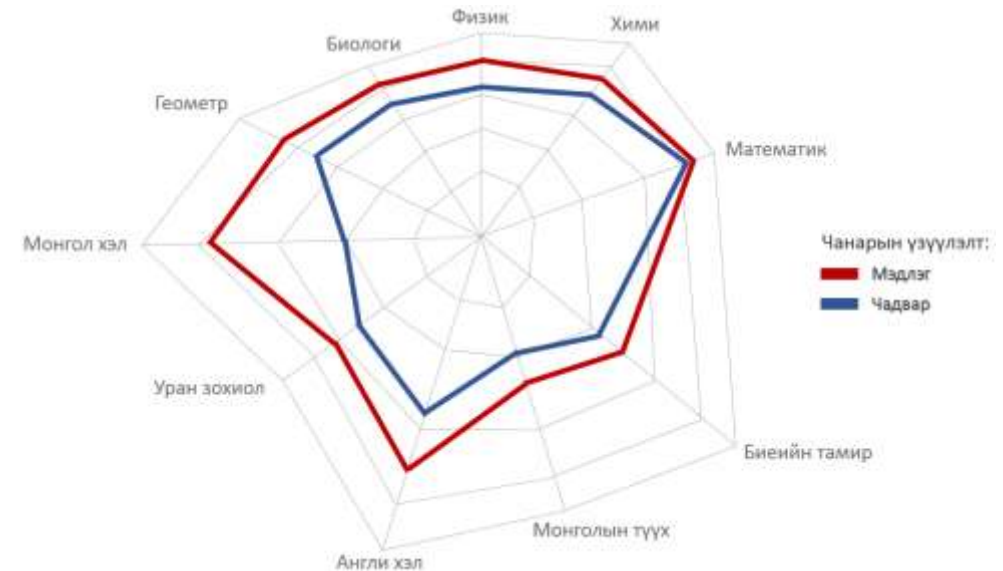
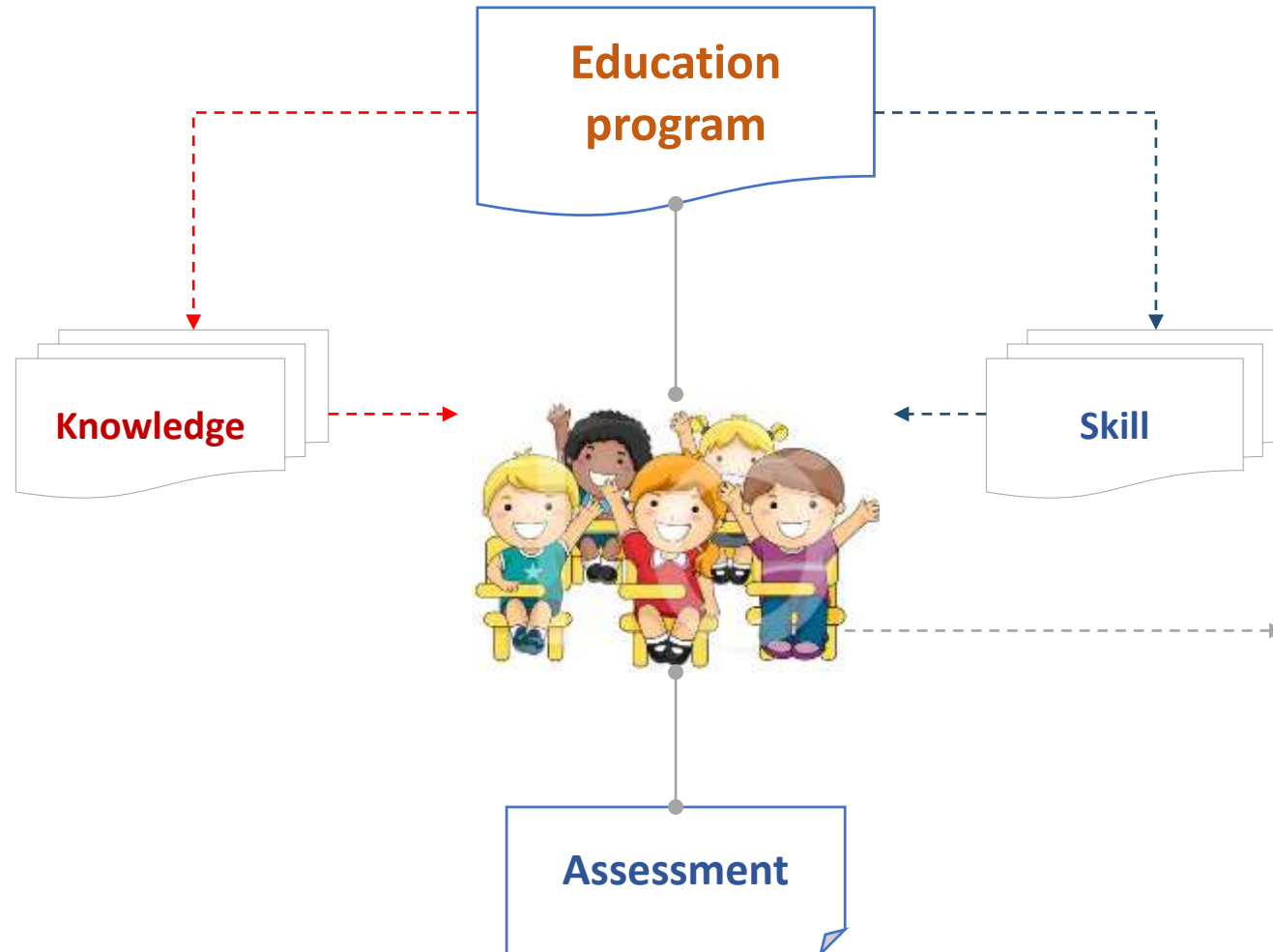
Result based management

Teacher

Teacher performance

Student, parent

Study analysis



Business analysis

Guide

Strategy analysis

Requirement analysis

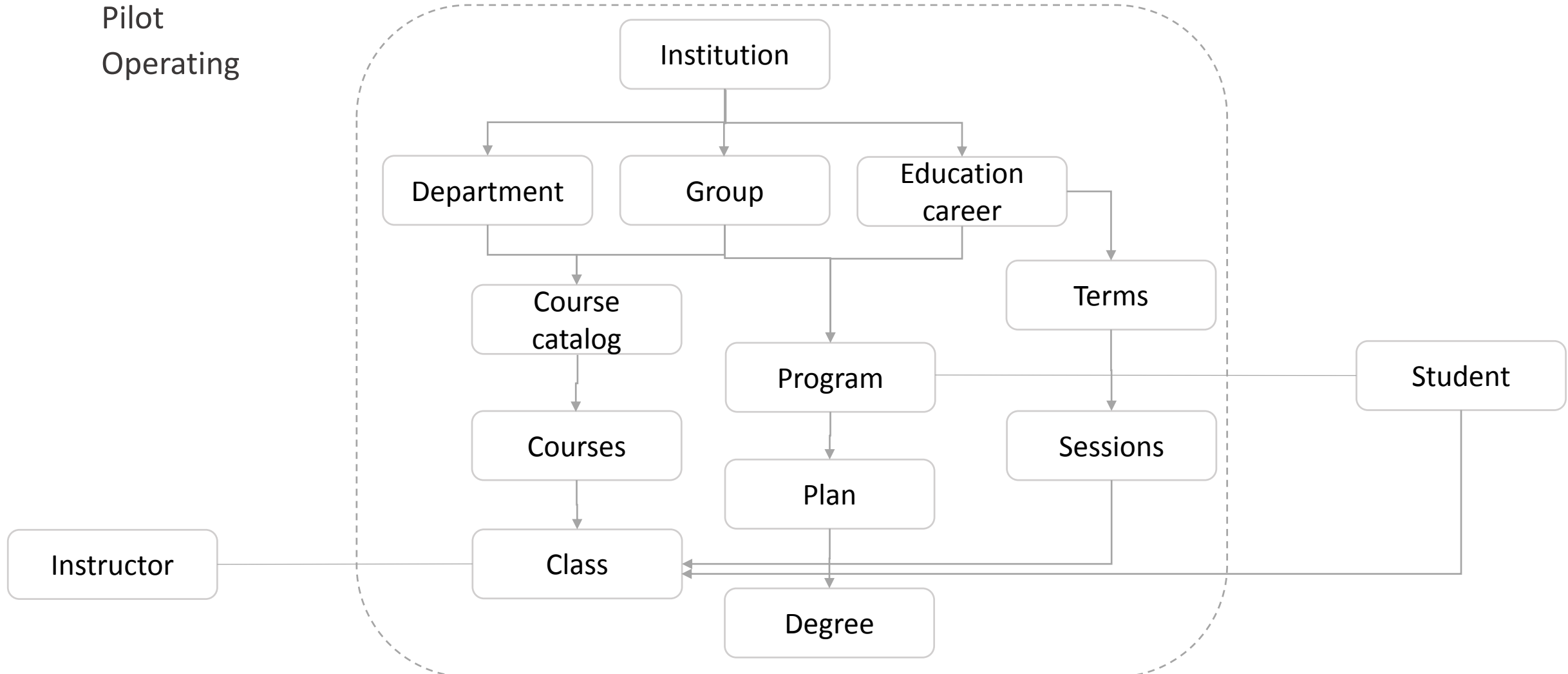
Solution

Solution evaluation

Prototype

Pilot

Operating



System analysis



System structure

System analysis

System structure model

Data model

Дэлгэцийн зохиомж

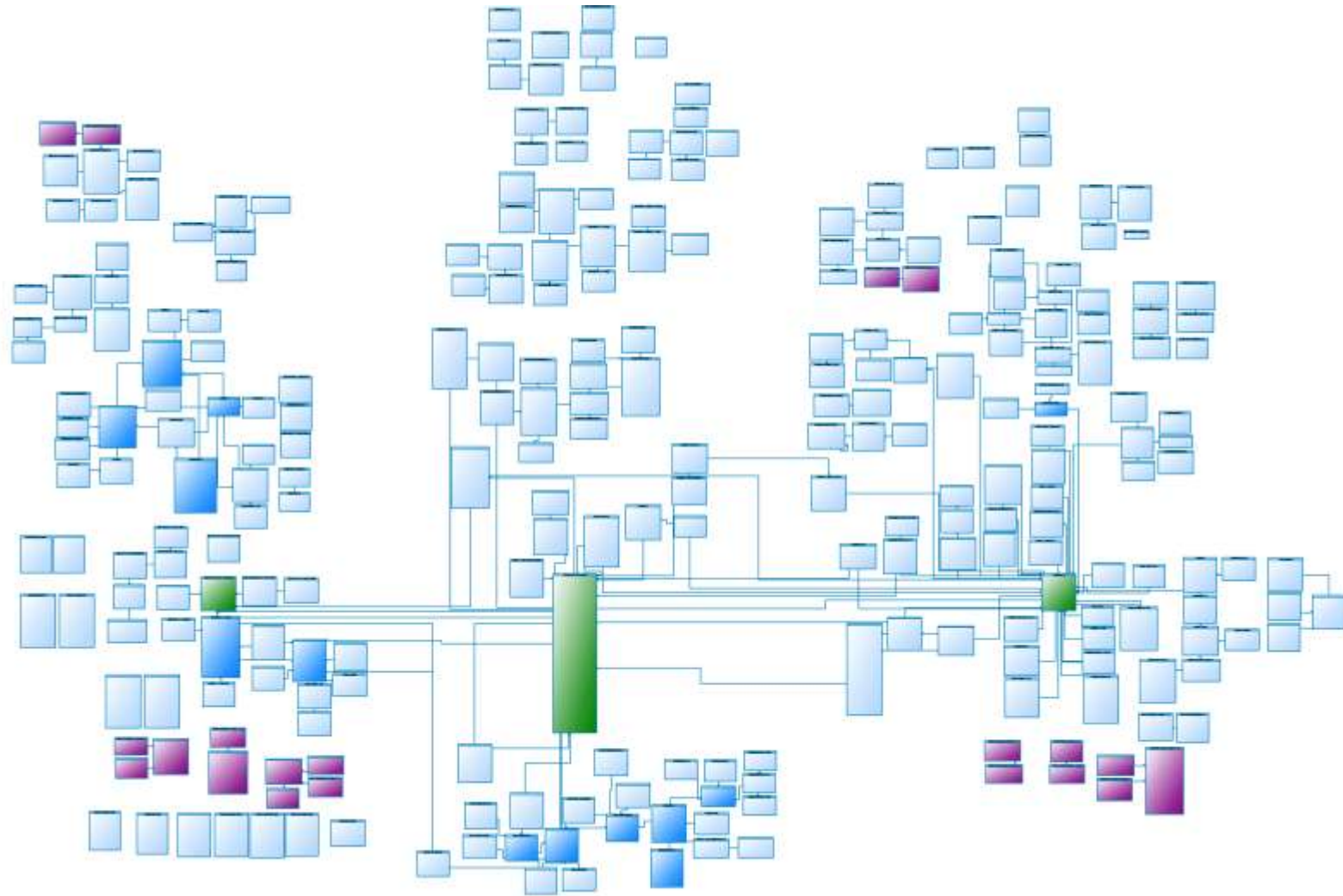
Data model

Conceptual model

Logical model

Physical model

Meta Data



System analysis

System structure model

Data model

Mockups

Mockups

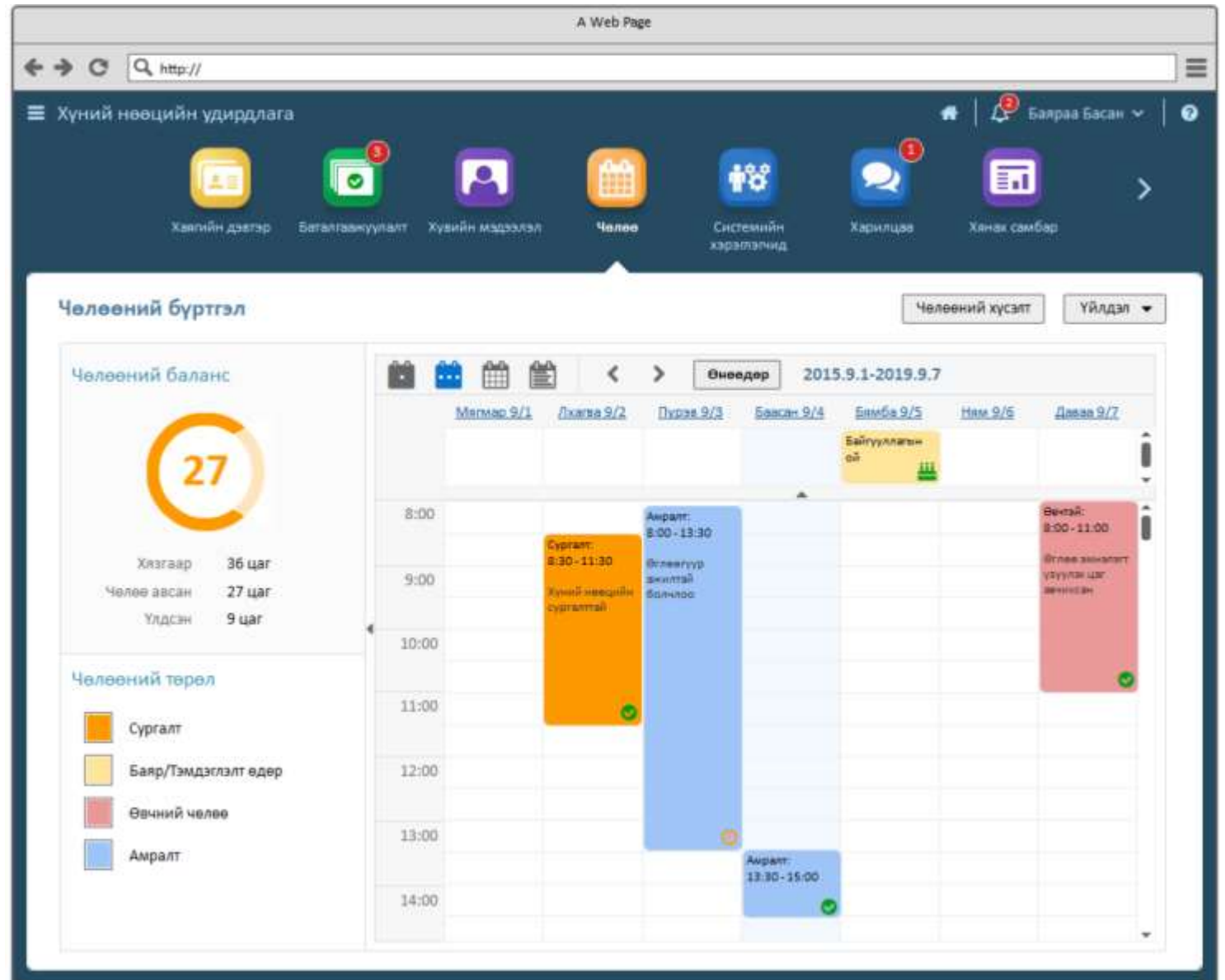
Sketch

Wireframe

Prototype & simulation

Visual design

Test & assessment



System development

Business component

Task flow

User interface

Testing

- Entities
- Associations
- View Objects
- View Links
- Application Modules

The screenshot displays a software development environment. On the left, a project tree shows a hierarchy of objects under 'RootQuestionnaireAM', including 'HrQuestionnaireQstnAM', 'HrAllQuestionsRead', 'HrAnswerColumns', 'HrAnswerRows', 'HrAnswerRowsTI', 'HrQuestionsEdit', 'HrQuestionsInsert', 'HrQuestionToAnswerColumnVL1', 'HrAnswerColumnsInsert', 'HrAnswerColToColumnTIVL1', 'HrAnswerColumnsTIInsert', 'HrQuestionToAnswerRowVL1', 'HrAnswerRowsInsert', 'HrAnswerRowToRowTIVL1', 'HrAnswerRowsTIInsert', 'HrQuestionToAnswerValidationFkVL1', 'HrAnswerValidationsInsert', 'HrAnswerValidationToValidationTIVL1', 'HrAnswerValidationsTIInsert', 'HrQuestionToHrAnswerVL1', 'HrAnswersInsert', 'HrAnswerToHrAnswerTIVL1', 'HrAnswersTIInsert', 'HrAnswerToHrAnswerVL1', 'HrChildAnswersInsert', 'HrQuestionToQuestionTIVL1', 'HrQuestionsTIInsert', 'HrQuestionsRead', 'HrResponseTypesRead', 'HrSubQuestionsInsert', 'HrSubQuestionToSubAnswerVL1', 'HrSubAnswersInsert', 'HrSubAnswerToSubTIVL1', 'HrSubAnswersTIInsert', 'HrSubQuestionToSubQuestionTIVL1', 'HrSubQuestionsTIInsert', and 'HrDetailedReportAM' with various 'Dt...' objects.

The main window shows the definition for 'HrQuestionToAnswerColumnVL1'. It includes a 'Default утга' section with fields for 'Хариултын өндөр' (500), 'Хариултын өргөн' (500), 'Жил агуулна' (N), and 'Цаг агуулна' (N). Below this is a dropdown menu for 'SubQuestionnaireId' with options like 'Байгууллагын асуулга', 'Сургалтын орчны асуулга', etc.

At the bottom, a table displays data for 'HrQuestionToAnswerColumnVL1':

AnswerC...	AnswerC...	Business...	QuestionId	Question...	SeqNum	Column...	Status	ObjectV...	CreatedBy	Creation...	LastUpd...
101021-002	65	1	358	1	2	70	A	3	anonymous	2014-05-1...	anonymous
101021-003	66	1	358	1	3	70	A	3	anonymous	2014-05-1...	anonymous
101021-004	70	1	358	1	4	70	A	3	anonymous	2014-05-2...	anonymous
101021-005	71	1	358	1	5	70	A	3	anonymous	2014-05-2...	anonymous

Name:RootQuestionnaireAM.HrQuestionnaireQstnAM.HrQuestionToAnswerColumnVL1 Definition:esis.hr.questionnaire.model.views.answers.links.HrQuestionToAnswerColumnVL

System development

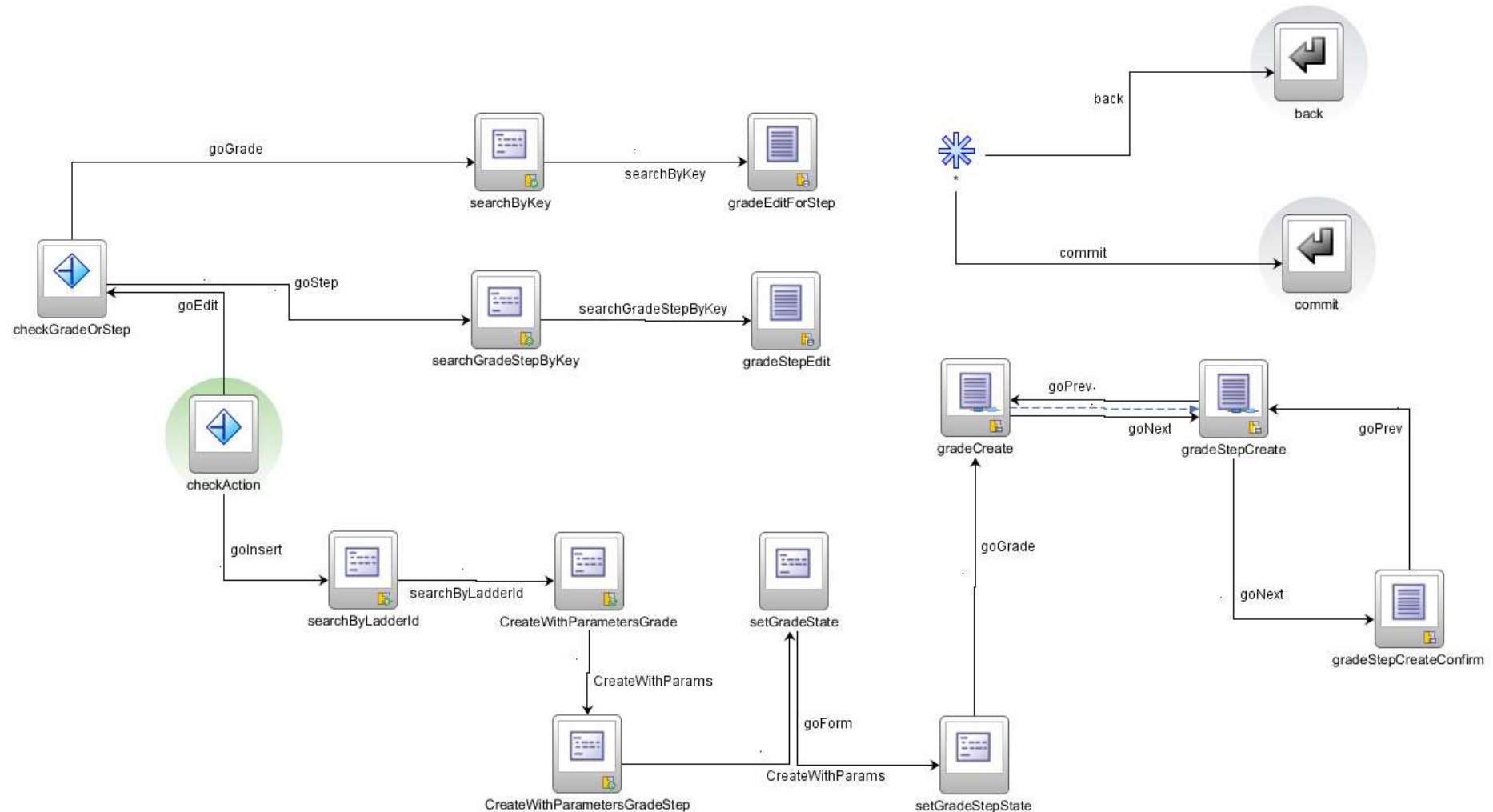
- Switches
- Navigations
- Methods
- Views
- Managed beans
- Servlets
- Parameters

Business component

Task flow

User interface

Testing



System development

Business component

Task flow

User interface

Testing

- Pages
- Forms
- Templates
- Layouts

Байгууллагын асуулга

Миний асуулга > Байгууллагатай холбоотой > Байгууллагын асуулга

Хэвлэх

1.8) Аймаг, нийслэлийн төвөөс а...

1.9) Сургуулийн ангилал

Ахлах сургууль

МОНГОЛ УЛСЫН ЗАСГИЙН ГАЗАР

2. Байгууллагын холбоо ба...

2.1) Холбоо барих утасны дугаар

2.2) Факсын дугаар

2.5) Хамран сурах хүүхдийн м...

Асуулгын удирдлага

Зарлал, мэдээлэл

Зарлал

Хэрэглэгчийн жагсаалт

Сан

Асуулгын жагсаалт

Асуулт, хариултын жагсаалт

Ирсэн асуулга

Ирсэн асуулга

Нэгтгэл, баталгаажуулалт

Сурагчийн асуулга

Байгууллагын асуулга

Удирдах ажилтны асуулга

Ажилтны асуулга

Багшийн асуулга

Хасагдсан сурагчийн асуулга

Дотуур байрны орчны асуулга

Боловсролын газрын ажилтны асуул

Хасагдсан ажилтны асуулга

Суралцдаггүй хүүхдийн асуулга

Сурах бичгийн асуулга

Сургалтын орчны асуулга

Номын сангийн асуулга

ЕБС нэгтгэл

Ихдээд сургууль, коллежийн асуулга

Оюутны асуулга /1-р курс/

Сургуулийн хөтөлбөрийн асуулга

Оюутны асуулга

Байгууллага асуулга

Багшийн асуулга

Удирдах ажилтны асуулга

Ажилтны асуулга

Дээд боловсрол нэгтгэл

Хуудас 1/2

4) Сургалтын мэдээлэл

4.1) Сурч буй данжаа

4.2) Нийт дуглуулсан багц цаг (2014-2015 оны эхний хагас жилийн кредитыг оруулж тооцно.)

4.3) Тухайн мэргэжлийн чиглэл (хөтөлбөр)-т элсэн орсон он

4.4) Элсэлтийн хэлбэр (Зөвхөн 1-р дамжааны оюутан, магистрант, докторант бөглөнө.)

4.5) Төгсөх дамжаанд сурдаг эсэх

5) Сургалтын төлбөр

5.1) 2014-2015 оны сургалтын төлбөрийн эх үүсвэр

5.2) 2014-2015 оны сургалтын төлбөрөө төлсөн эсэх

№	Хүүхдийн нас	Хүн амын тоо/бүгд/	Үүнээс эмэгтэй	Тойргийнхоо сургуульд суралцдаг хүүхдийн тоо
1	бнас			

3 Хуудас, 45 асуулт байна.

38/45 (75%)

System development

Business component

Task flow

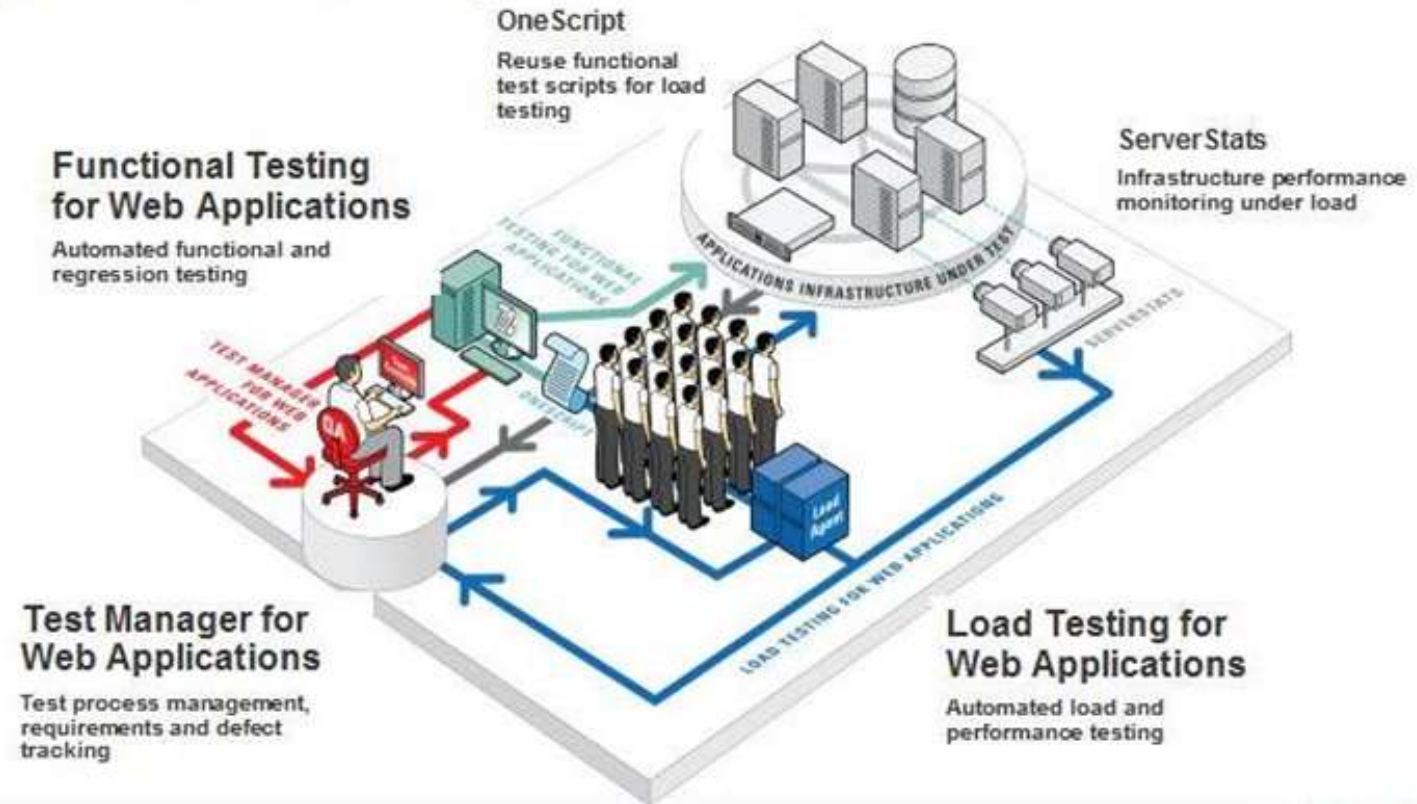
User interface

Testing

- Unit test
- Functional test
- Performance test

Application Testing Suite

A powerful, integrated testing solution for ensuring application quality, performance and reliability



Applications

- Schools: 700+
- Students: 515,000 +
- Teachers: 25,000+
- Record: 70+ millions
- Concurrent user: 10,000+

Сургалтын төлөвлөгөө

Төлөвлөгөө хайх

Бага -Өдөр
Суурь -Өдөр
 Бүрэн дунд -Өдөр

3 төлөвлөгөө байна.

Суурь -Өдөр

Боловсролын түвшин Суурь боловсрол
 Хэв шинж Ердийн
 Сургалтын хэлбэр Өдөр

222 Суралцагч
 7 Бүлэг
 23 Хичээл
 4305 Нийт цаг (т/а)

Д/д	Судлагдахуун	Хичээл	6-р анги		7-р анги		8-р анги		9-р анги	
			Судлах цаг	Судлах төрөл	Судлах цаг	Судлах төрөл	Судлах цаг	Судлах төрөл	Судлах цаг	Судлах төрөл
1	Монгол хэл, бичиг	Монгол хэл	105	Заавал	70	Заавал	70	Заавал	70	Заавал
2	Монгол хэл, бичиг	Монгол бичиг			70	Заавал	70	Заавал	35	Заавал
3	Гадаад хэл	Англи хэл	105	Заавал	105	Заавал	105	Заавал	105	Заавал
4	Гадаад хэл	Орос хэл			70	Заавал	70	Заавал	70	Заавал
5	Уран зохиол	Уран зохиол	70	Заавал	70	Заавал	70	Заавал	70	Заавал
6	Шашин, ёс суртахуун	Иргэний боловсрол	35	Заавал	35	Заавал	35	Заавал	35	Заавал
7	Хөгжим	Хөгжим	35	Заавал	35	Заавал	35	Заавал	35	Заавал
8	Дүрслэх урлаг	Дүрслэх урлаг	35	Заавал	35	Заавал	35	Заавал		
9	Нийгмийн ухаан	Түүх			70	Заавал	70	Заавал	70	Заавал
10	Нийгмийн ухаан	Нийгмийн ухаан			35	Заавал	35	Заавал	35	Заавал
11	Нийгмийн ухаан	Хүн ба нийгэм	35	Заавал						
12	Байгалийн ухаан	Хими					70	Заавал	70	Заавал
13	Байгалийн ухаан	Физик			35	Заавал	70	Заавал	70	Заавал
14	Байгалийн ухаан	Биологи			70	Заавал	35	Заавал	35	Заавал
15	Байгалийн ухаан	Газарзүй			70	Заавал	35	Заавал	35	Заавал
16	Байгалийн ухаан	Хүн ба байгаль	70	Заавал						
17	математик	Математик	175	Заавал	140	Заавал	140	Заавал	140	Заавал
18	Мэдээллийн технологи, компьют...	Мэдээлэлзүй	35	Заавал	35	Заавал	35	Заавал	35	Заавал
19	Архитектур, дизайн	Зурагзүй							70	Заавал
20	Биеийн тамир, эрүүл мэнд, спорт ...	Эрүүл мэнд	35	Заавал	35	Заавал	35	Заавал	35	Заавал
21	Биеийн тамир, эрүүл мэнд, спорт ...	Биеийн тамир	70	Заавал	70	Заавал	70	Заавал	70	Заавал
22	Техник технологи, инженерчлэл	Технологи	35	Заавал	70	Заавал	70	Заавал	70	Заавал
23	Нийгмийн ажил	Төсөлт ажил	35	Заавал						
Тогтвортой агуулга Сургууль зохицуулах			875 0		1120 0		1155 0		1155 0	

Data warehouse

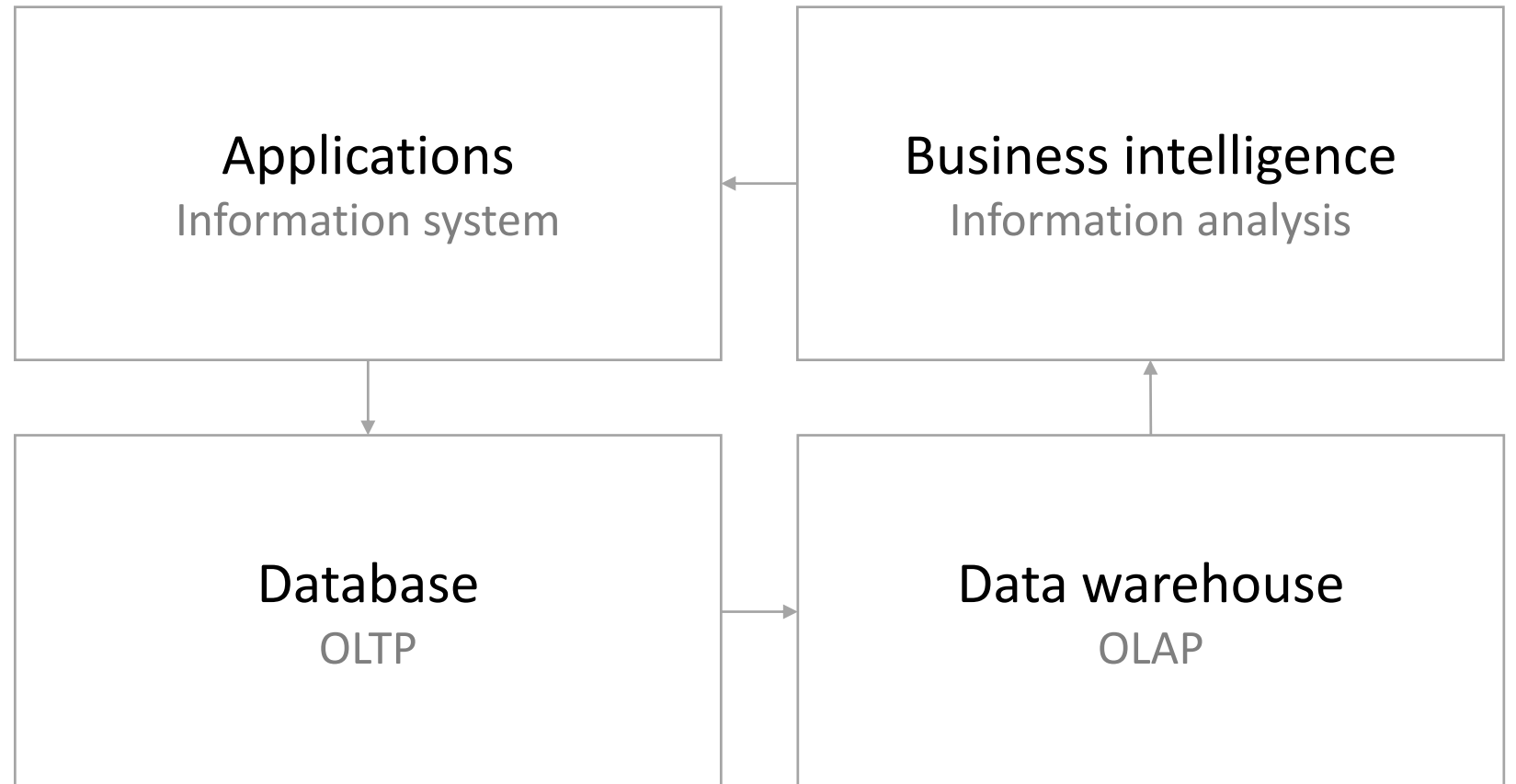
Information lifecycle

Warehouse design

Information transform

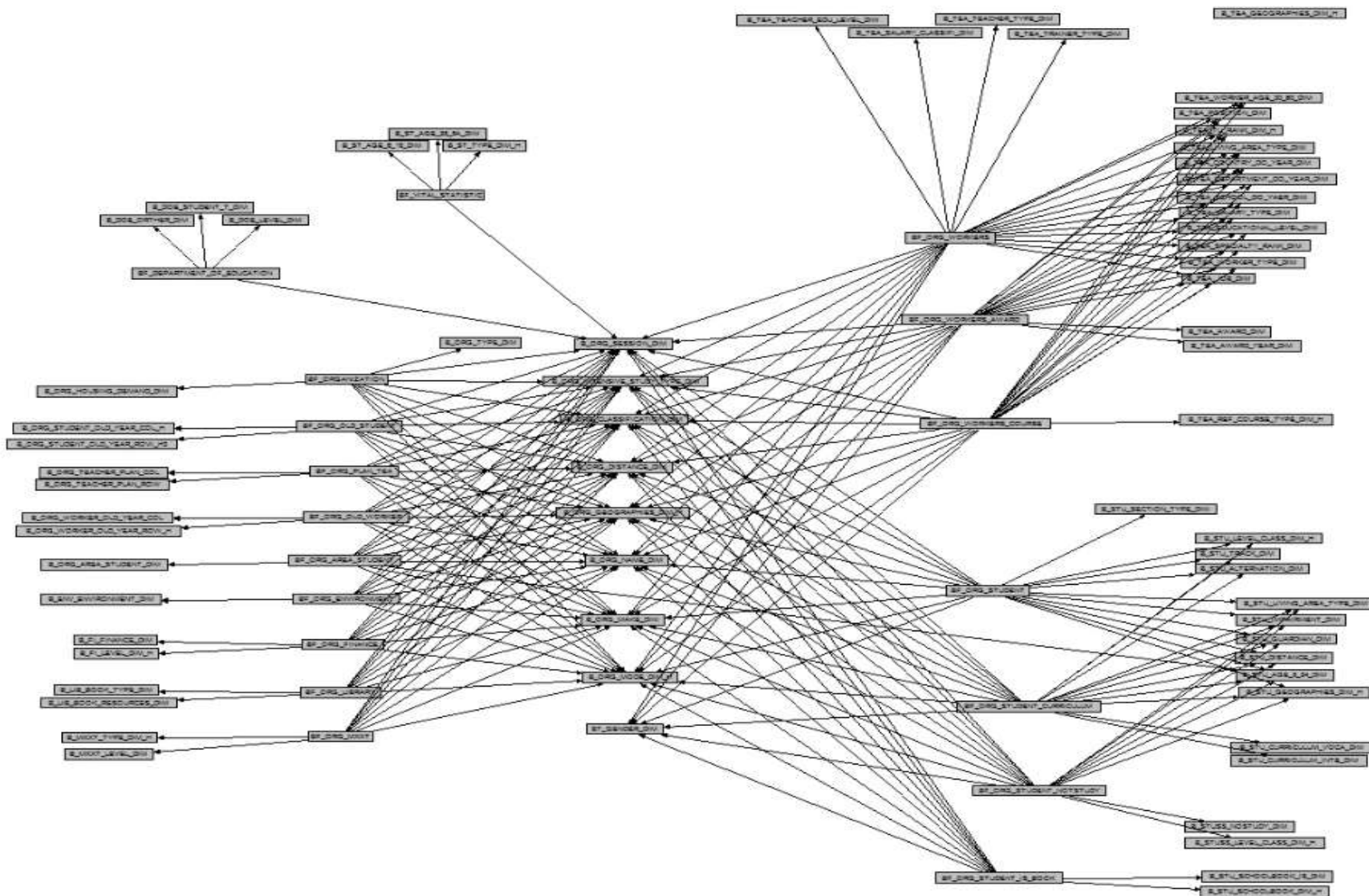
Business intelligence

- Applications
- Database
- Data warehouse
- Business intelligence



Warehouse design

- Historic Data model(Fact and dimensions)
- Real time data model



Data warehouse

Information lifecycle

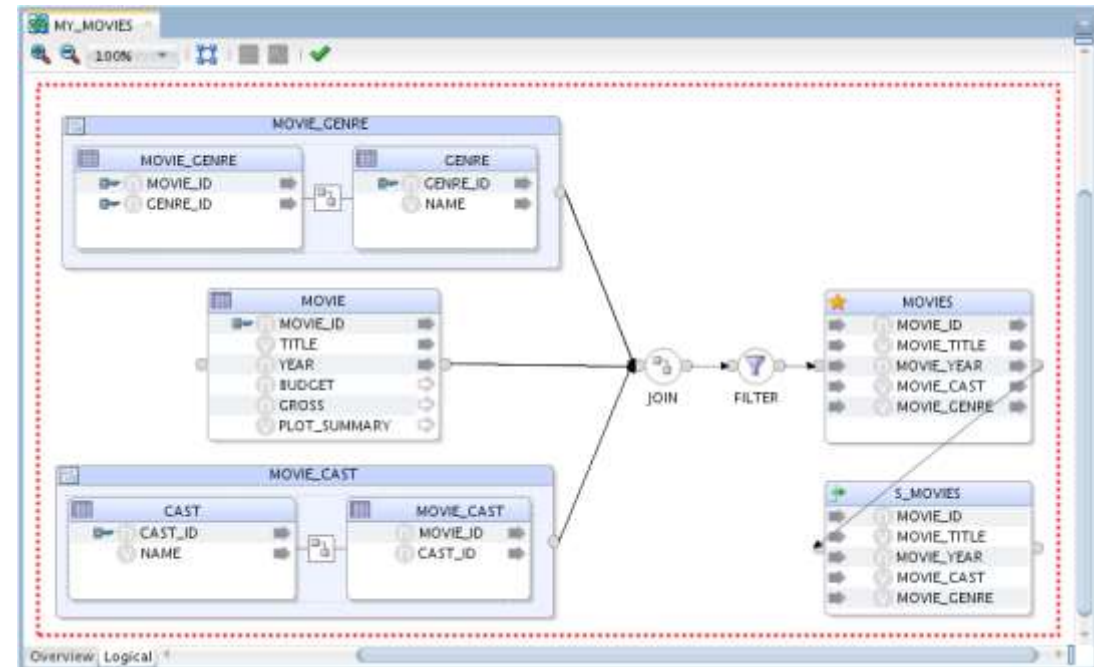
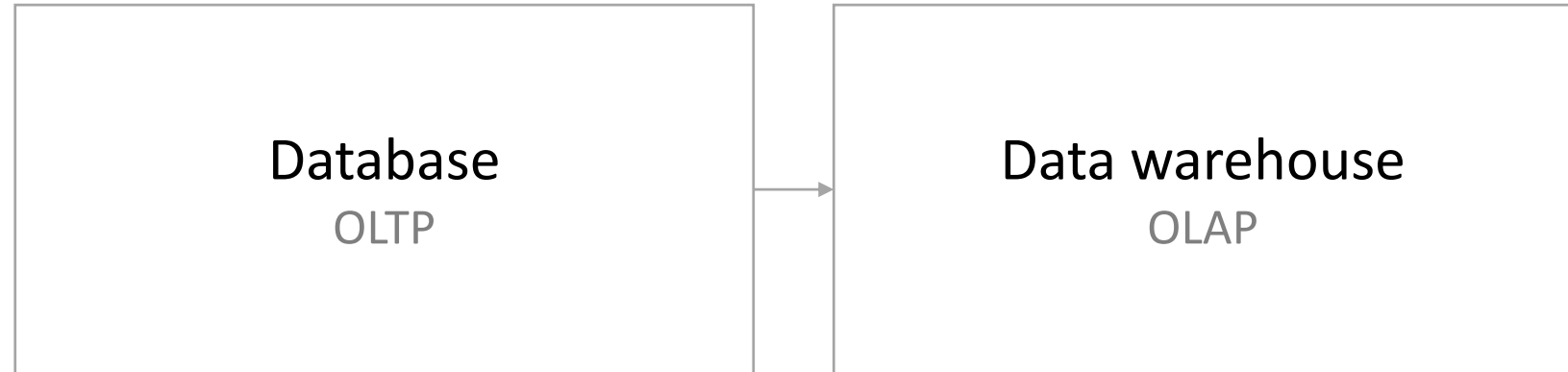
Warehouse design

Information transform

Business intelligence

ETL

- Scenario
- Extract, load, transform



Data warehouse

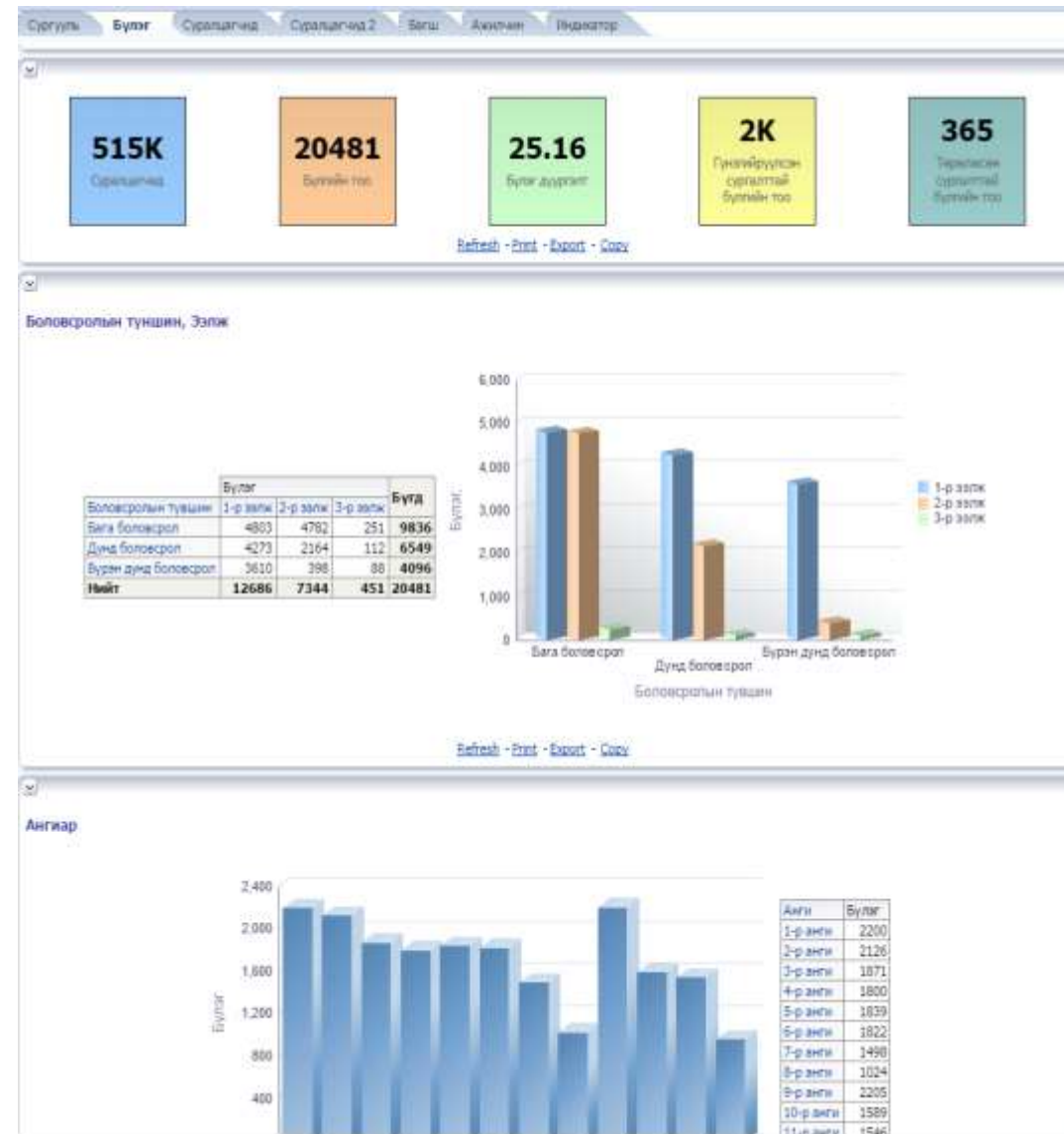
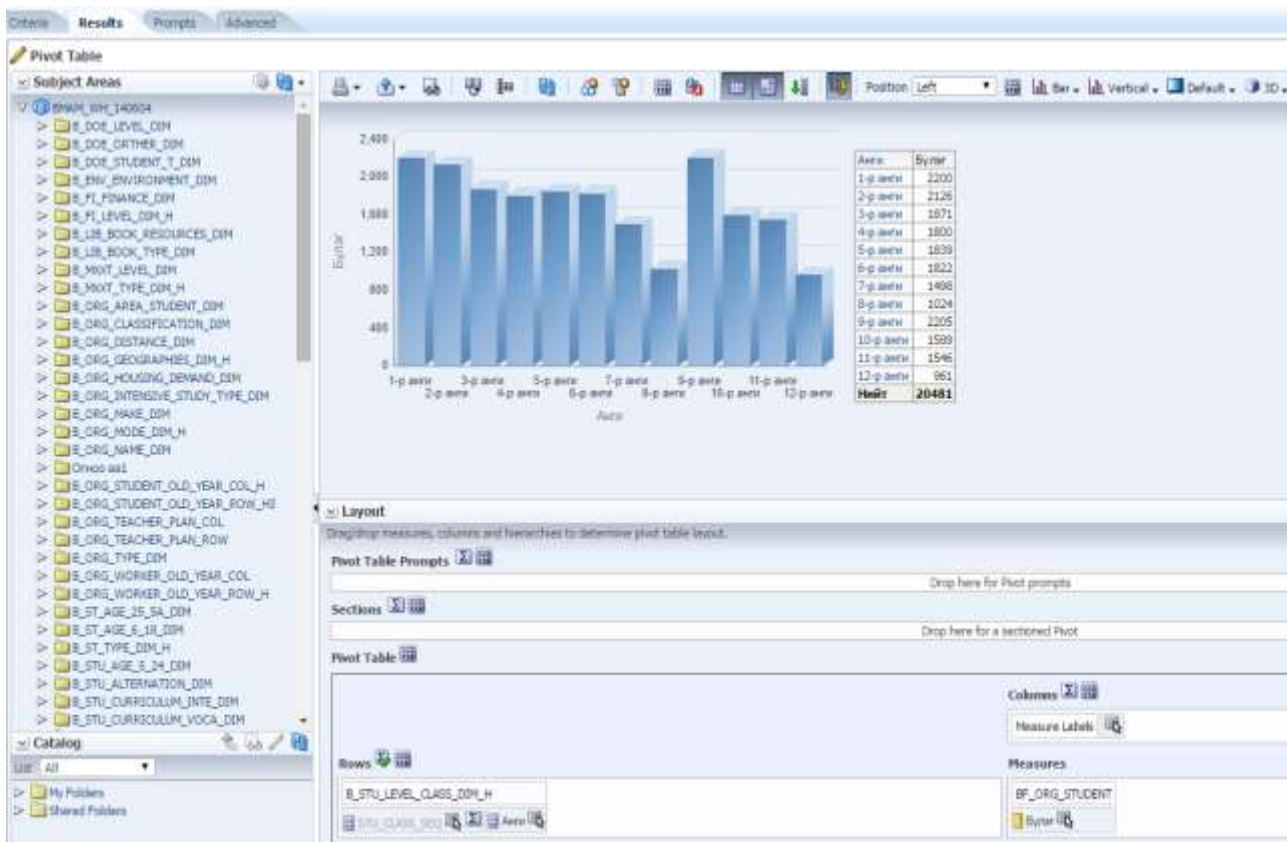
Information lifecycle

Warehouse design

Information transform

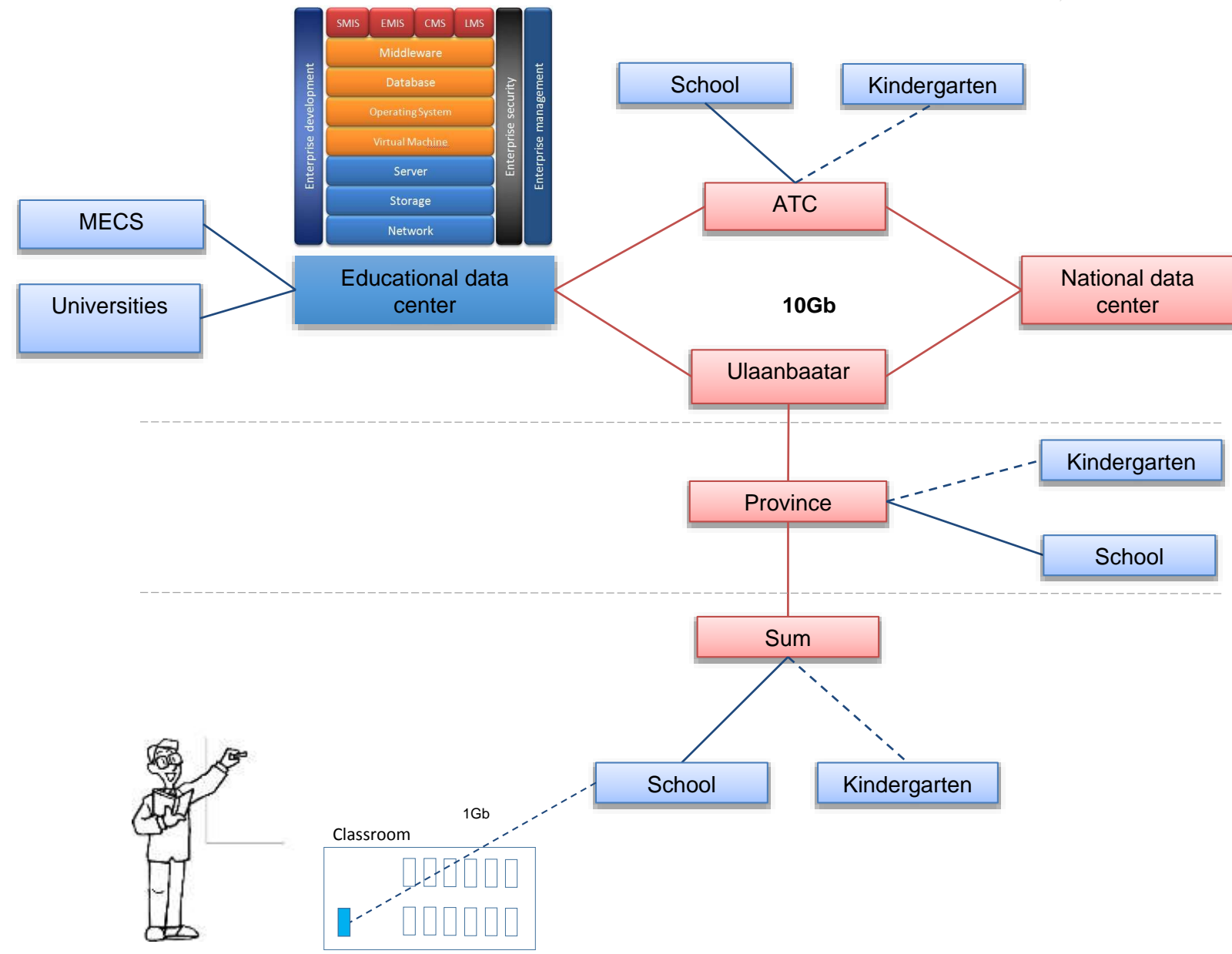
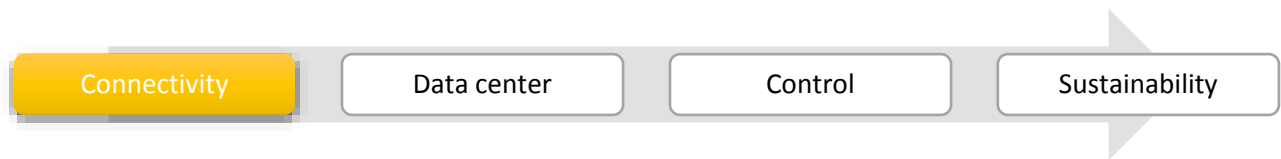
Business intelligence

- Business component
- Design in runtime
- Drag and drop reports



Infrastructure

- Province connectivity
Fiber optic cable to every administrative unit
- School connectivity
Fiber optic cable to every school
- Classroom connectivity
Wired network to every classroom
- Student connectivity
Wireless connection to every student, teacher and employee



Infrastructure

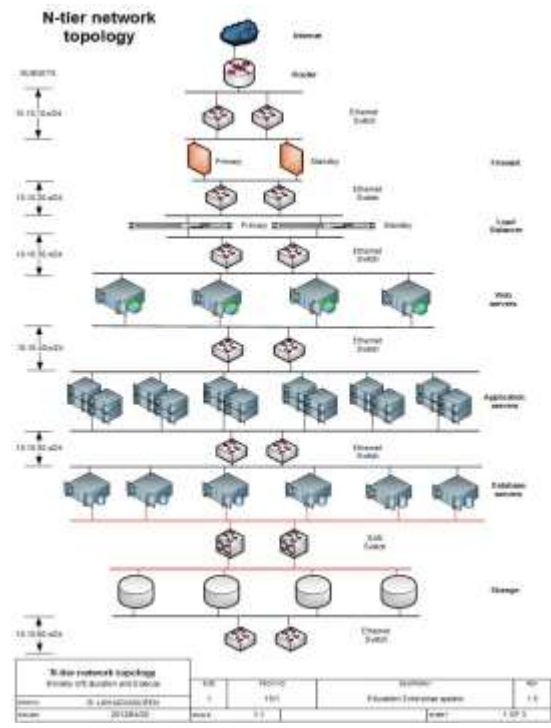
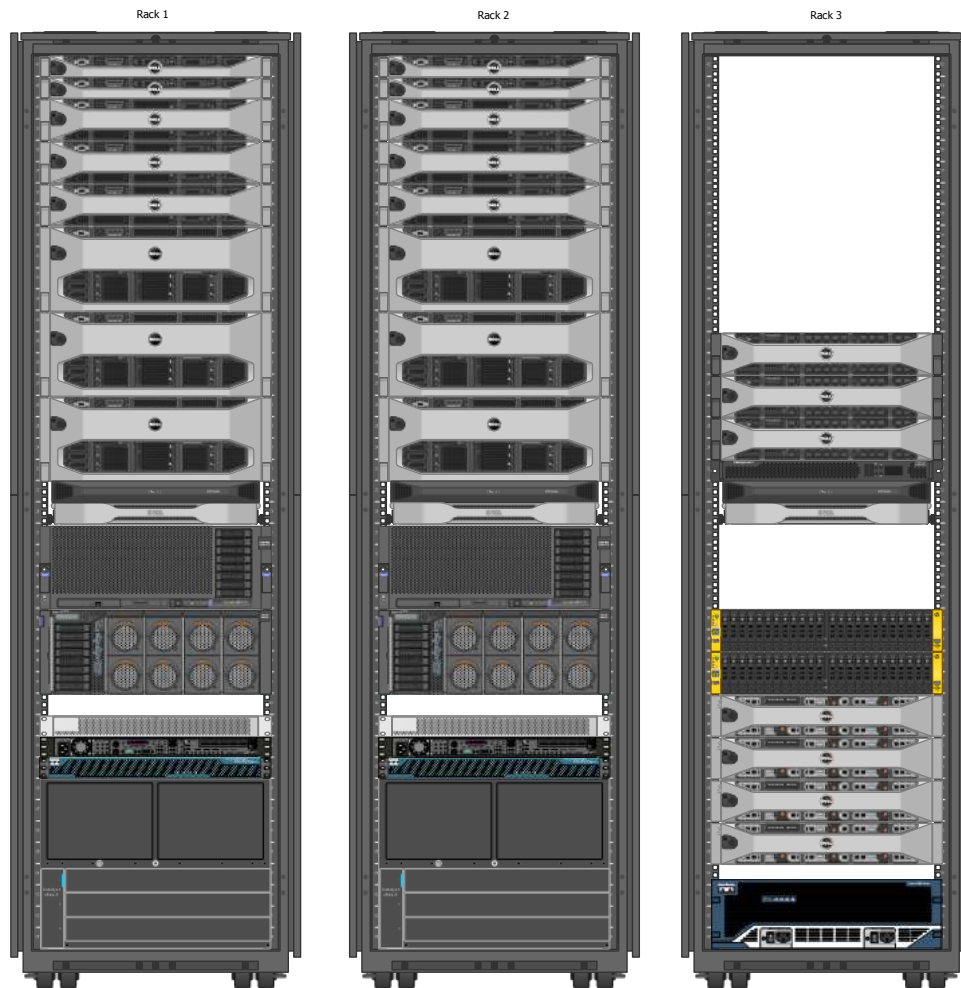
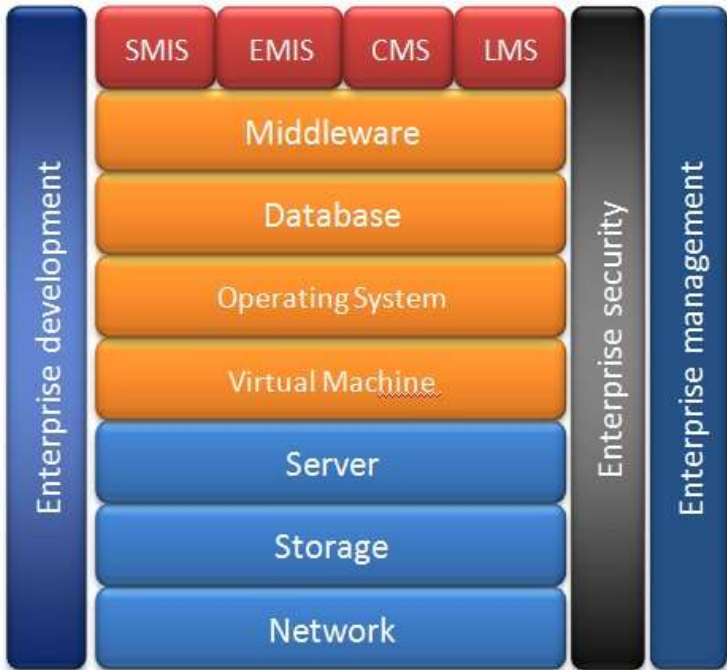
Connectivity

Data center

Control

Sustainability

- Applications
- Application platform
- Hardware platform
- Enterprise management
- Enterprise security
- Enterprise development



Infrastructure

Connectivity

Data center

Control

Sustainability

Enterprise Manager Ops Center

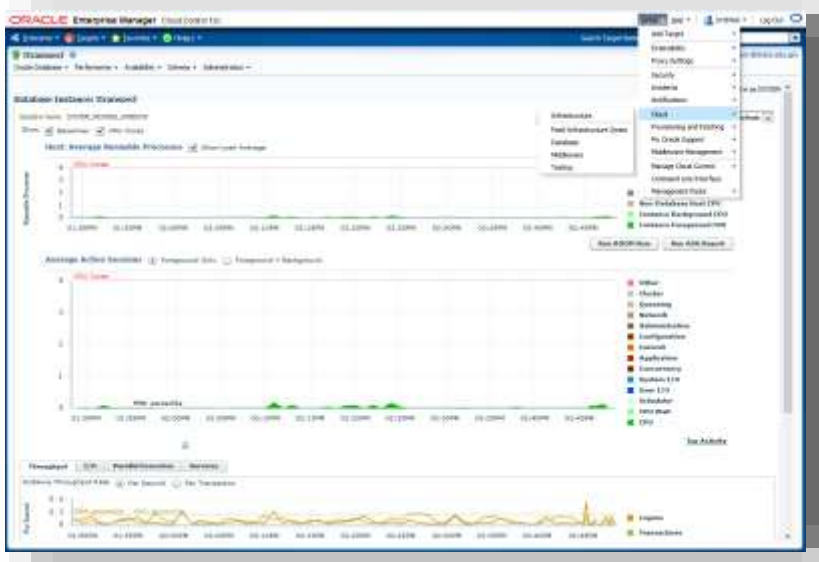
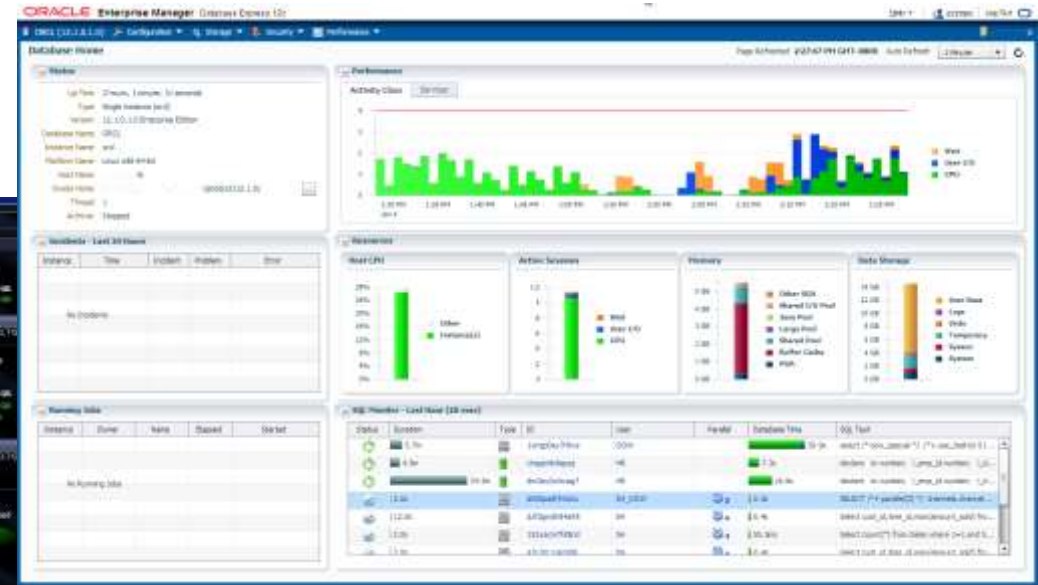
Network, Server, Storage device, virtual machine, Operating system management

Enterprise Manager Cloud Control

Database, middleware, application management

Quest Spotlight

Network, server, database control



Infrastructure

Connectivity

Data center

Control

Sustainability

Network

Nationwide fiber optic network

Data center

National level datacenter

Application development

Enterprise grade applications

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Maintenance

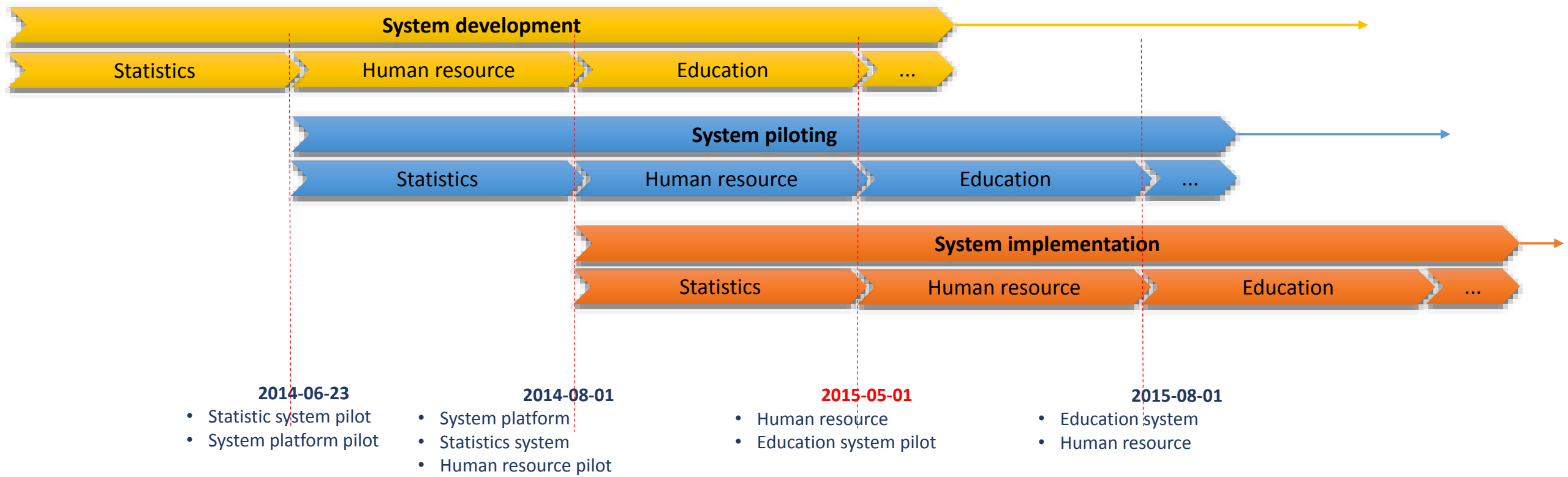
Development

Human resource

Policy



Milestones



Thank you for attention

