

# Advanced Technology in Municipal Water Management

**June 11, 2001**



# Agenda

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- Part 1 - Vision
  - Background
  - The Region of Waterloo Vision
- Part 2 - Realizing the Vision - Phase 1
  - Business Requirements
  - Business Model
  - Implementation Overview
- Part 3 - The Solution
  - Technology Solution Overview
  - TIS Demonstration

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# Part 1 – Vision

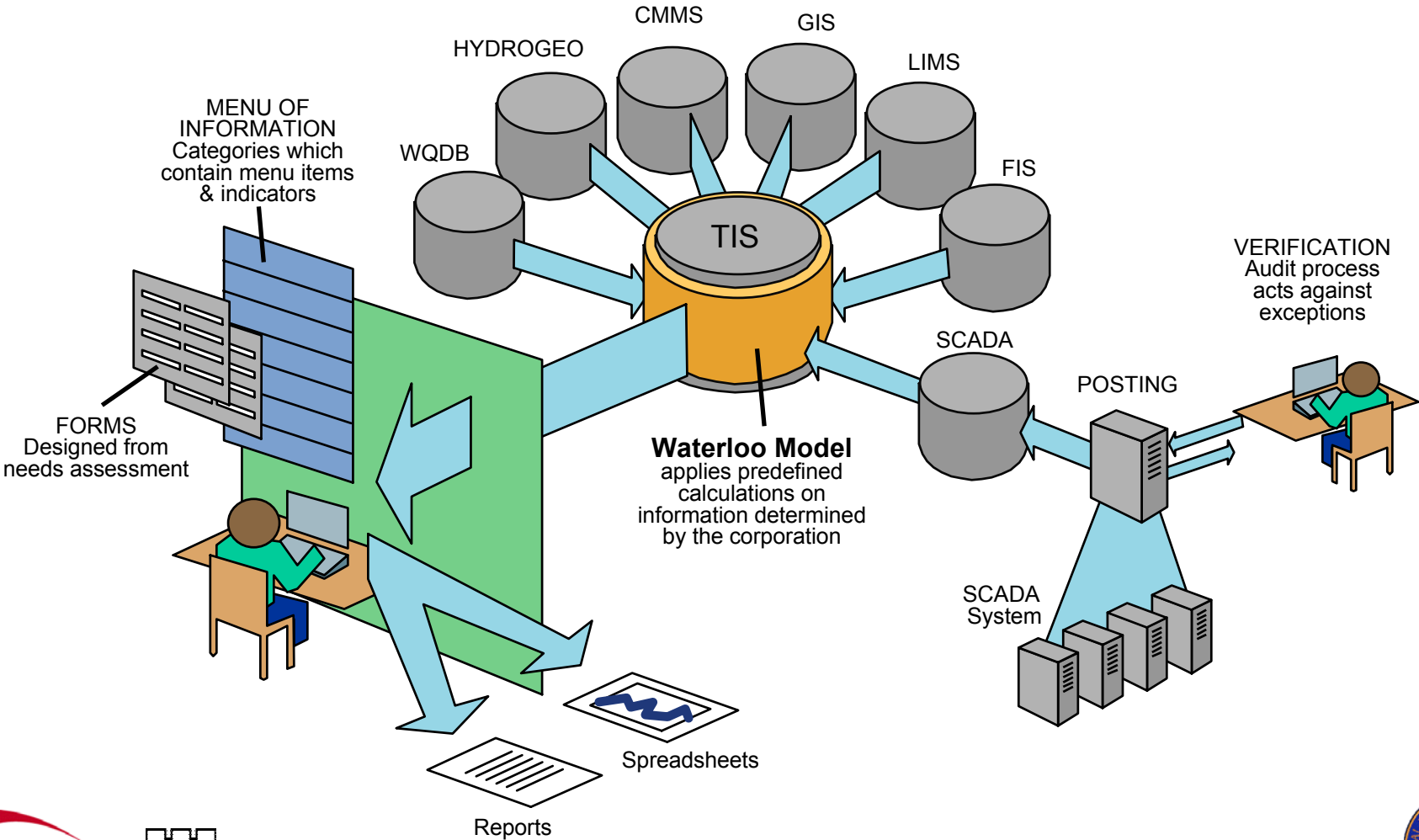


# Background

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- In early 1997 the Region of Waterloo Water Services Division enlisted the assistance of Chartwell an IT Consulting firm and Proctor and Redfern (now Earth Tech) an Engineering Firm to conduct a study for a potential system
- In 1998, a TIS pilot project was initiated to give Regional staff the opportunity to see how the proposed system would work.
- In 1999 the Waterloo Region had a demonstration of the POMS project at the City of Toronto Water and Wastewater Division,
- In Fall of 1999, the Waterloo Region initially scoped the project and developed the detailed requirements for phase 1.
- In January 2000, the Waterloo Region approved the implementation of the first phase of the Technical Information System.

# Waterloo Region Vision



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# Part 2 – Realizing the Vision

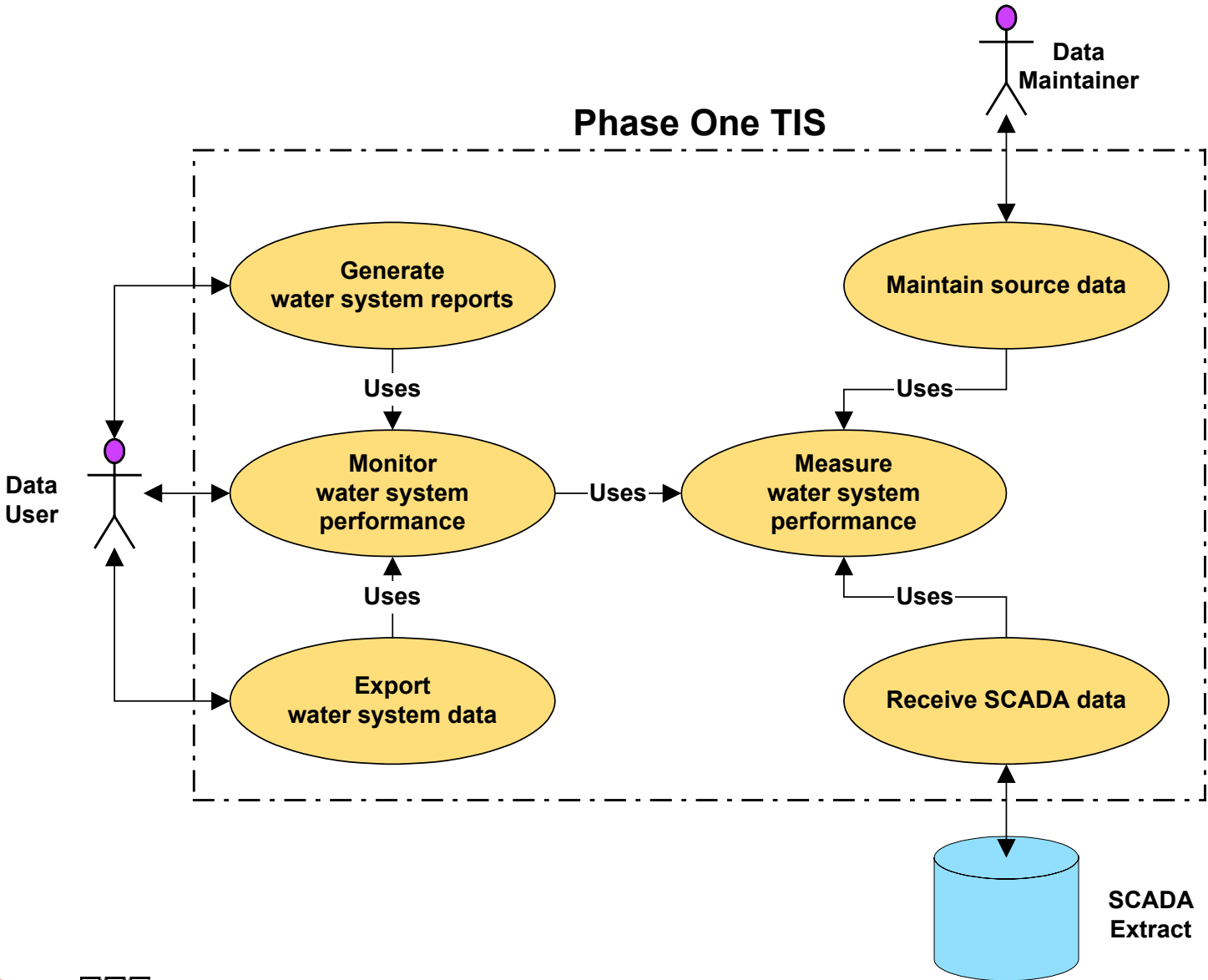
## Phase I

# Phase One TIS Objectives

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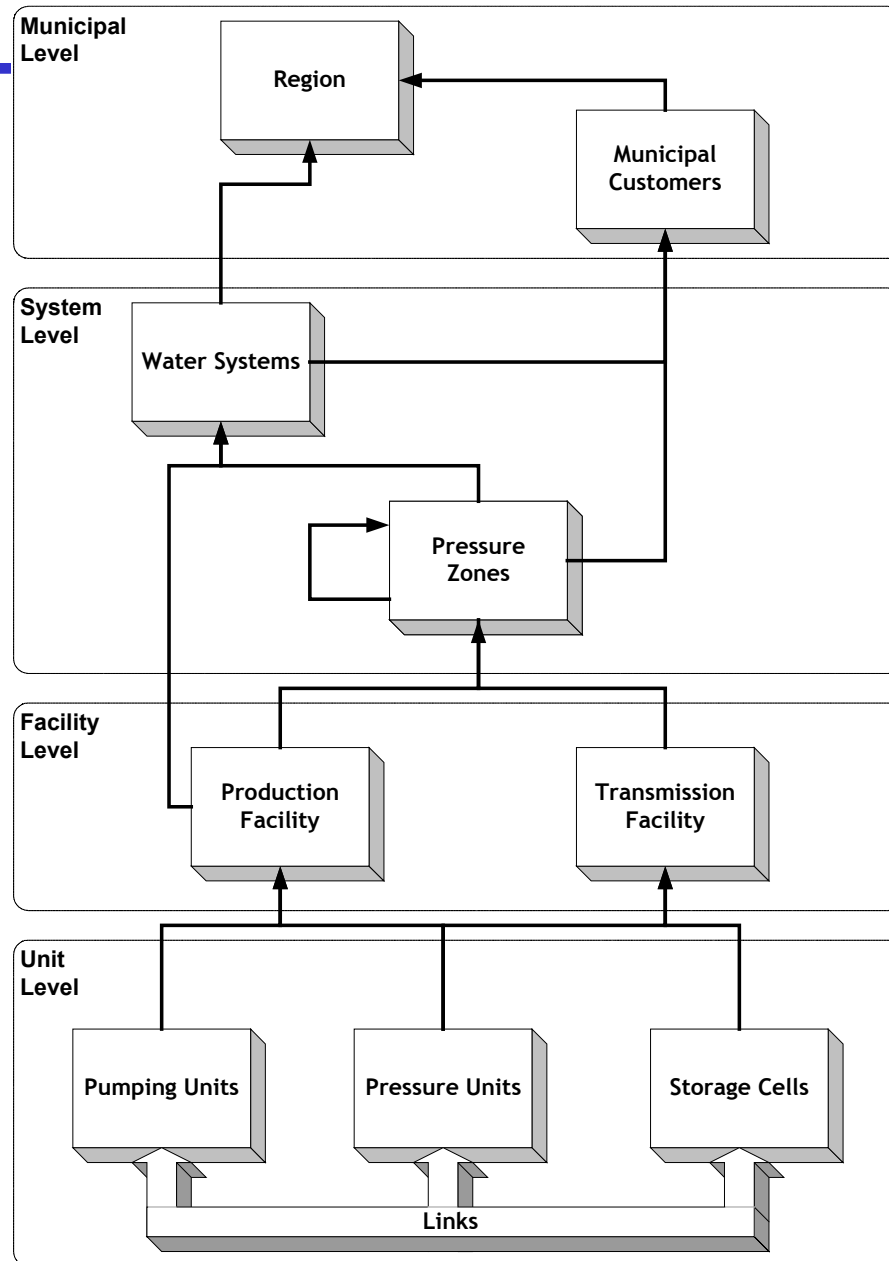
- *SCADA data access*
  - Provide ready access to all measurement data from SCADA system
- *Regional self-sufficiency*
  - Make the staff of the Region as self-sufficient as possible to maintain and extend TIS
- *Extensible TIS infrastructure*
  - Implement an extensible hardware and software infrastructure to meet future TIS and corporate requirements.

# Phase One TIS Business Requirements



# TIS model

## *TIS business model*



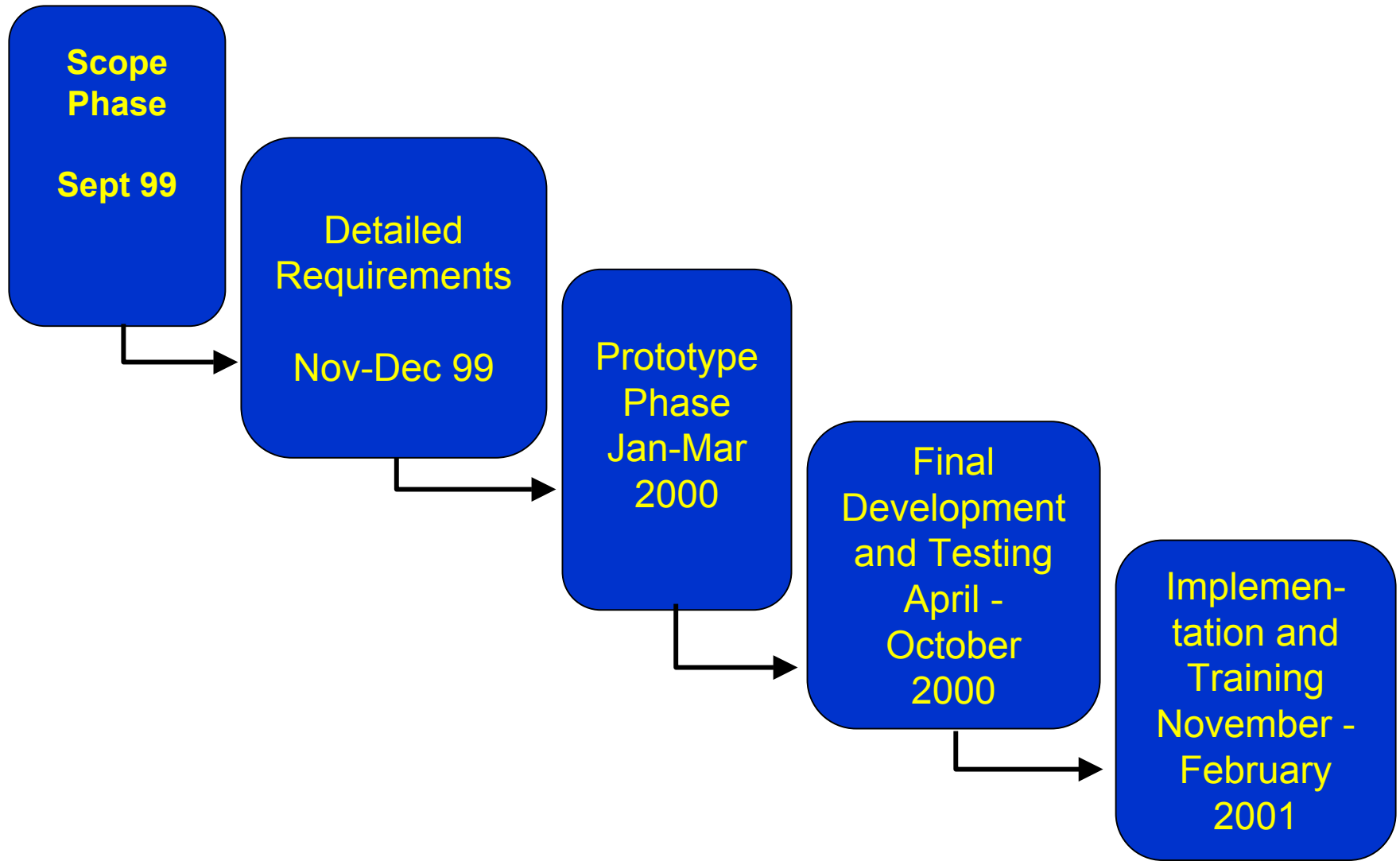
# Phase One TIS Performance Indicators

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- Water demand
  - by region, customer, system & pressure zone
- Available in storage
  - by region, municipality, system, pressure zone & reservoir
- Water production
  - by region, system & facility
- Water elevation
  - by reservoir
- Water pressure
  - by facility
- Water consumption
  - by municipality

# TIS Project Plan

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# Project Resources

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- Jorge Cavalcante, Waterloo Manager Water Services
- John Micholosky, Supervisor SCADA
- Joe Pierra, SCADA Analyst
- Walter Gasparini, Director of Technology
- Nigel Roberts Manager, Information Systems
- Fenghui Wang, Waterloo DBA
- Brian Van Kessel, Chartwell Project Manager
- Susan Finley, Chartwell Configuration/Technology
- Karen Holtze, Chartwell Configuration/Technology
- Ben Kotic, Chartwell Partner Technology
- Ian Gilmour, Chartwell Business Architect
- Teodor Giles, Chartwell Configuration
- Alacrity / Cherniak Resources

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# Part 3 – The Solution



# ARM (Alacrity Results Management) System

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- Object oriented technology written in IBM's VisualAge SmallTalk (see [www.ibm.com](http://www.ibm.com)), using a fully objected oriented database (Gemstone/S), a Brokat Technologies product (see [www.brokat.com](http://www.brokat.com)).
- Reports are generated using Seagate Software's Crystal Reports -- a sophisticated and robust reporting tool (see [www.crystaldecisions.net](http://www.crystaldecisions.net)).
- ARM product supported by Cherniak Software, a 23 year old Canadian software development company (see [www.CherniakSoftware.com](http://www.CherniakSoftware.com))

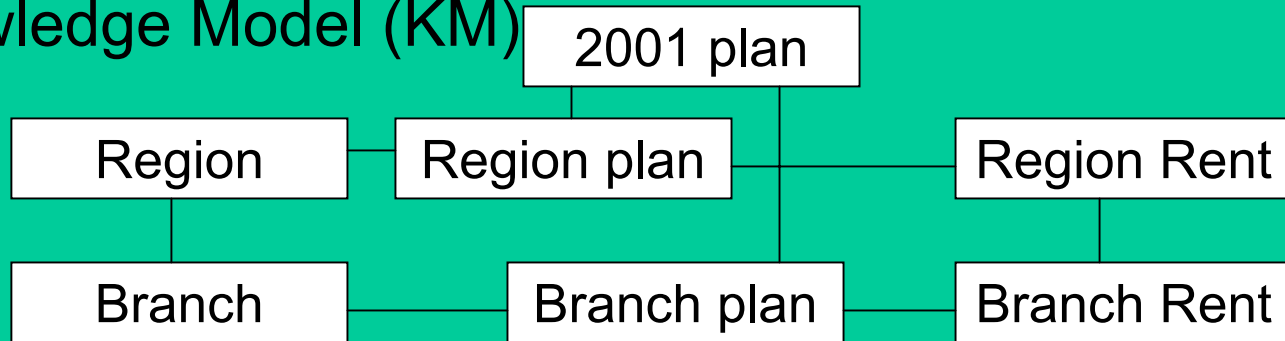
# Alacrity Results Management (ARM) Benefits

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- Integrates information from multiple sources
  - Provides both automatic and manual information entry
- Very flexible configuration facility
  - Consolidates information in multiple hierarchies
  - Provides user defined:
    - calculations
    - reports
    - statuses and status relationships
- Information can be viewed at multiple levels, e.g. entire region, single station, single pump, etc.
- All information allows for full drill-down to source, including calculations involved
- Provides on-line graphs and reports

# Configuration Management (Define Model, Build Model)

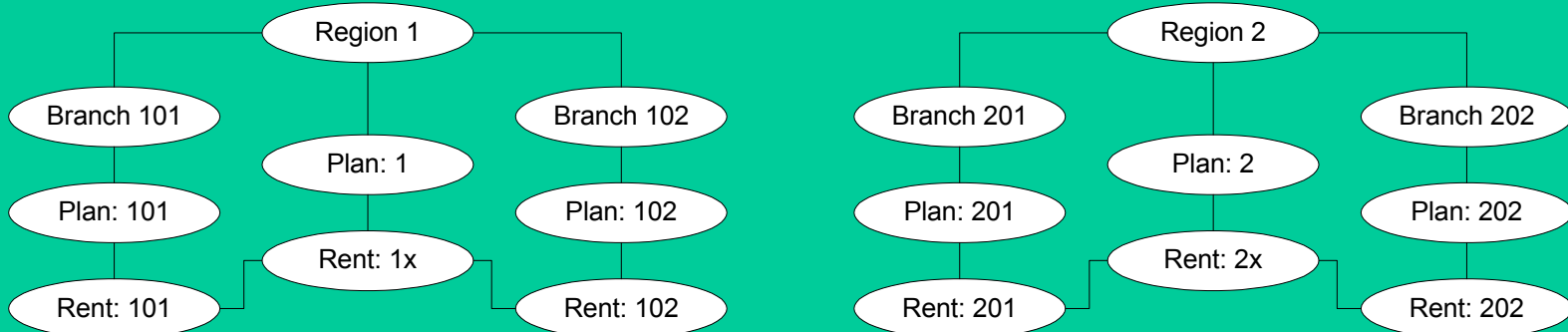
## Knowledge Model (KM)



The OM is automatically generated from the KM.

Build

## Operational Model (OM)



# Logical Layers in ARM

User Interface

Strong separation  
between  
each layer.

Conversion

Network

Knowledge Model

Domain

The domain contains both  
data (state) and behaviour.

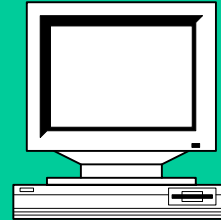
Operational Model



# Physical Layers in ARM

IBM Visual Age

Crystal Reports



User Interface

GemBuilder

Forwarders

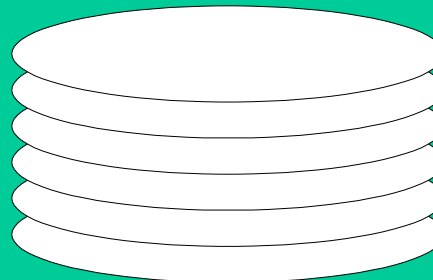
Date converters

Replicants

Number converters

TCP/IP Network (works over Internet)

GemStone/S



Domain



# External System Interfaces

## External Data Sources

webMethods

VB  
Widgets

Crystal  
Reports

Auto  
CSV  
file I/O

Manual  
CSV  
file I/O

ActiveX

IBM Visual Age

CORBA is supported by GemStone.

GemStone

An ODBC interface to GemStone is available.

TopLink

TopLink is an Object to SQL mapping tool.

SQL Databases

Oracle

Sybase

Informix



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# TIS Demonstration



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# Questions and Answers

