

# Oracle Foundations for Healthcare

## Healthcare Transaction Base

### Leveraging HL7 V3 RIM

Mike Higgins  
Senior Director  
Oracle Healthcare  
August 12, 2003

ORACLE

# Healthcare Interoperability Platform

HTB Sales Training 2003Aug12

ORACLE

# Healthcare Transactions

HTB Sales Training 2003Aug12

ORACLE

# Integrated Application Support

## Based on the Reference Information Model

HTB Sales Training 2003Aug12

ORACLE

# Messaging Services Inbound

HTB Sales Training 2003Aug12

ORACLE

# Inbound Message Processor Domain value validation


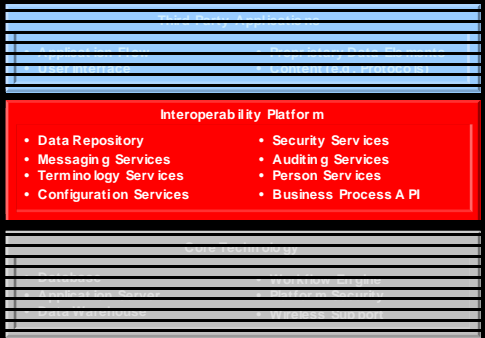
Coding Scheme	Version	Code	ETS ID	Equivalents
HL7	1.17	14080	00001	00012, 00347
SNMEDCT	15.7	122-443	00007	
HL7	1.18	14080	00012	00001, 00347
ICD-9	2003	164.05	00158	
LINC	2.08	2435-2	00347	
HL7	1.17	14081	12345	00001, 00002
HL7	1.17	14082	00034	

- Determine ETS ID that matches the Scheme, Version and Code (00012)
- Identify Concept List (or the vocabulary domain (HTB.ObservationMethod))
- Check that ETS ID belongs to Concept List (false)
- Otherwise check if version equivalent (00001) or cross scheme mapping (00347) belongs to Concept List (true)

HTB Sales Training 2003Aug12

ORACLE

# Healthcare Transaction Base Interoperability Framework

**Interoperability Platform**

- Data Repository
- Messaging Services
- Terminology Services
- Configuration Services
- Security Services
- Auditing Services
- Person Services
- Business Process API


HTB Sales Training 2003Aug12 **ORACLE** Slide 8

# Discussion Slides



HTB Sales Training 2003Aug12 **ORACLE** Slide 9

# Outline



- Product vision
- Product features
- Current projects
- Roadmap

HTB Sales Training 2003Aug12 **ORACLE** Slide 10

# Core Services



- Terminology Mediation
- Person Services
- Auditing and Security
- Message Management

HTB Sales Training 2003Aug12 **ORACLE** Slide 11


# Terminology Services



- Terminology mediation
- Terminology loading
- Local customization
- Versioning
- GUI administrative utility

HTB Sales Training 2003Aug12 **ORACLE** Slide 12

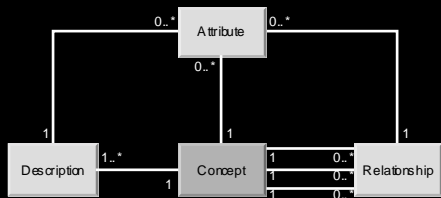
# Terminology Services Mediation



- Generic model for loading cross mappings
- Terminology specific cross-map support
  - SNOMED CT to ICD-9-CM
  - SNOMED CT to ICD-10

HTB Sales Training 2003Aug12 **ORACLE** Slide 13

## Terminology Services Concept Oriented Reference Model



HTB Sales Training 2003Aug12

ORACLE  
Slide 14

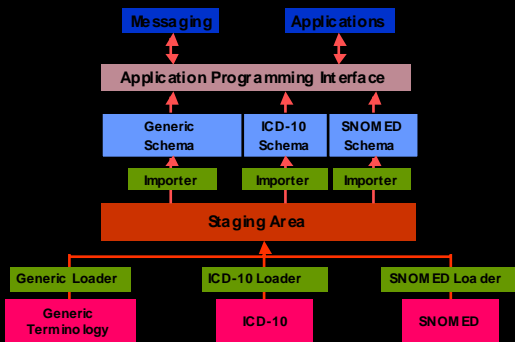
## Terminology Services Loading

- Support for flat file formats
- Loader program places content into Staging Area
- Import program
  - Performs validations
  - Places content in tables

HTB Sales Training 2003Aug12

ORACLE  
Slide 15

## Terminology Services Loading



HTB Sales Training 2003Aug12

ORACLE  
Slide 16

## Supported Vocabularies Current release

Vocabulary	Description	Source	Concept Count
LOINC	Logical Observation Identifiers Names and Codes	LOINC website	30588
ICD-10	The International Statistical Classification of Diseases and Related Health Problems, tenth revision	WHO	14197
SNOMED CT	SNOMED Clinical Terms	CAP	325856
ICD-9-CM v1	International Classification of Diseases, Ninth Revision, Clinical Modification, Sixth Edition, Volume 1	ADPContext	15361
ICD-9-CM v3	International Classification of Diseases, Ninth Revision, Clinical Modification, Sixth Edition, Volume 3	ADPContext	4306
DRG	Diagnostic Related Groups	CMS website	506
MDC	Major Disease Categories	CMS website	25
ICPCS	Alphanumeric Health Care Procedure Coding System	CMS website	5104
HL7v3	HL7 Vocabulary Domains	HL7 website	7054
CPT	Current Procedural Terminology	ADPContext	8140
NUBC-UB92	Subset of the codes used in the UB92 form	UB92 Manual	91

HTB Sales Training 2003Aug12

ORACLE  
Slide 17

## Pers on Services

- Centralized person management
- Support for key demographic data
- Duplicate identification
- Duplicate merging
- Correlation

HTB Sales Training 2003Aug12

ORACLE  
Slide 18

## Pers on Services Centralized person management

- Centralized creation and editing of person records
- Maintain key identifying demographic data for persons
- Functionality support in the API:
  - Create Person
  - Create Temporary Person
  - Update Temporary Person
  - Activate Person
  - Update Person
  - Deactivate Person

HTB Sales Training 2003Aug12

ORACLE  
Slide 19

## Person Services Duplicate identification



- Batch and real time probabilistic matching across the person domain
- Algorithm features:
  - Attributes cleansing and standardization
    - Names and address cleansing and word replacement
    - Name compression (e.g. Soundex)
    - Address standardization, e-mail cleansing
  - Similarity scores
    - Attribute level scoring
  - Configurable duplicate and distinct thresholds

HTB Sales Training 2003Aug12

ORACLE

Slide 20

## Person Services Duplicate merging



- Duplicate resolution by record merging
- Merge Features
  - Attribute level merge
  - Dependent entity merge or transfer
  - Unmerge support not available in Release 1

HTB Sales Training 2003Aug12

ORACLE

Slide 21

## Person Services Correlation



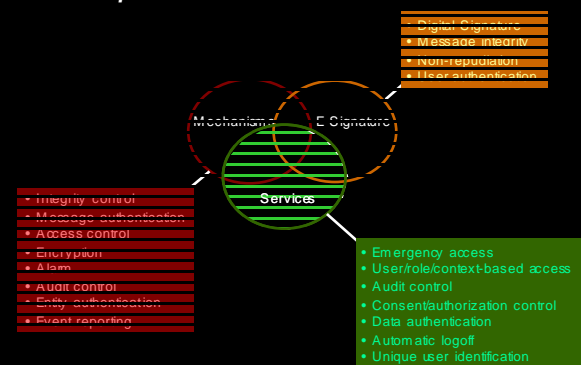
- Synchronization of persons across systems to maintain an identifier cross-index with external repositories
- Functionality support in the API:
  - Batch correlate
  - Correlate person
  - Create correlation data
  - Transfer correlation data
  - Find person by external ID
  - Merge cross-references
  - Delete external reference

HTB Sales Training 2003Aug12

ORACLE

Slide 22

## Security and Auditing HIPAA Requirements



HTB Sales Training 2003Aug12

ORACLE

Slide 23

## Security and Auditing Access control



- Self access (staff, patient, person)
- Role-based access
- Relationship-based access
  - Staff designee
  - Patient caregiver/agent, consent/authorization
  - Encounter-based
- Context-based access (organization, facility)
- “Break-the-glass” access

HTB Sales Training 2003Aug12

ORACLE

Slide 24

## Security and Auditing Auditing features



- Auditing information
  - User
  - Action on object
  - Date and time
  - Site or access point
  - Descriptions
- Trigger events
  - Patient care events
  - Security-mediated events
  - Security admin events

HTB Sales Training 2003Aug12

ORACLE

Slide 25

## Security and Auditing

### Authorization policy rule examples

- Location-based
  - Nurses and clerks can view or change data for patients located in the user's facility
- Participation-based access of patients
  - Physicians can view data for patients in the same medical services and write data for the patients they are treating
- Consent-based access of encounters
  - Staff can view encounters for which the patient has given consent

HTB Sales Training 2003Aug12

ORACLE

Slide 26

## Security and Auditing

### Management application

- GUI-based application
- Manages all aspects of security
  - User accounts view/create/delete/change
  - Roles view/create/delete/change
  - Role memberships view/add/delete
  - Grant rules create/delete

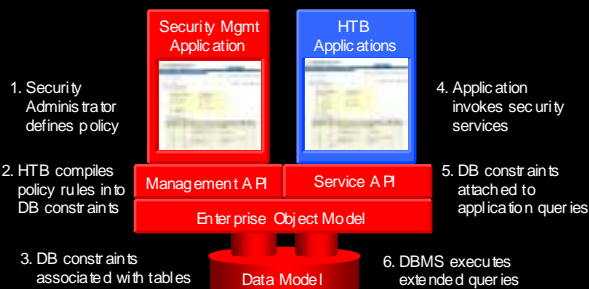
HTB Sales Training 2003Aug12

ORACLE

Slide 27

## Security and Auditing

### Authorization policy engine



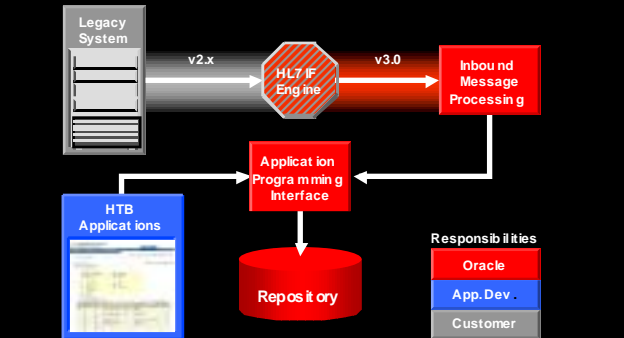
HTB Sales Training 2003Aug12

ORACLE

Slide 28

## Message Services

### Inbound



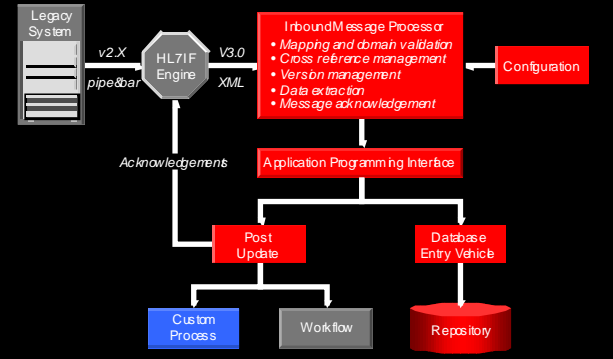
HTB Sales Training 2003Aug12

ORACLE

Slide 29

## Messaging Services

### Inbound



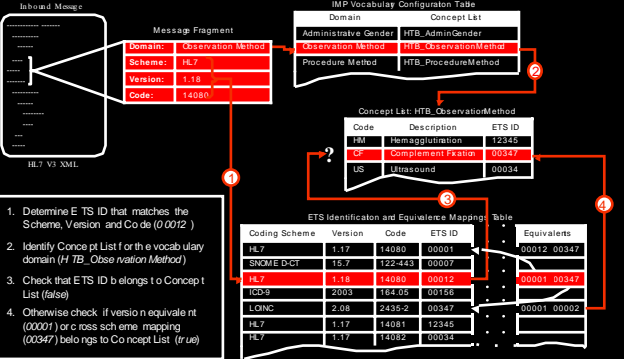
HTB Sales Training 2003Aug12

ORACLE

Slide 30

## Inbound Message Processor

### Domain value validation



HTB Sales Training 2003Aug12

ORACLE

Slide 31

## Inbound Message Processor Cross-reference

Applies to key HTB entities:

- Clinical Acts
- Encounter
- Location and Organization
- MRN, Person, Staff, Guarantor

Act Cross Ref	
Issuer ID	Act
Lab 440B	394
Lab 891P	605

Current Version	
ID	V
394	2
395	2
396	1

HTB Sales Training 2003Aug12 ORACLE Slide 32

## HL7v2.4 Messages Supported types

- Patient Administration
- Order Entry
- Observation Reporting
- Master Files
- Patient Care

HTB Sales Training 2003Aug12 ORACLE Slide 33

## Person Registry

Description	Trigger Event	Structure
Add person record in a master patient index	A28 – Add Person Information	ADT_A05
Update person record in a master patient index	A31 – Update Person Information	ADT_A05
Delete all demographic information for a person	A29 – Delete Person Information	ADT_A21

HTB Sales Training 2003Aug12 ORACLE Slide 34

## Staff Registration

Description	Trigger Event	Structure
Add staff record to the Practitioner or Master Files	M02 – Staff/ Practitioner Master File	MRN_M02
Update a staff record in the Practitioner or Master Files	M02 – Staff/ Practitioner Master File	MRN_M02
Delete a staff record from the Practitioner or Master Files	M02 – Staff/ Practitioner Master File	MRN_M02
Reactivate a deactivated staff record in the Practitioner or Master Files	M02 – Staff/ Practitioner Master File	MRN_M02
Deactivate a staff record in the Practitioner or Master Files	M02 – Staff/ Practitioner Master File	MRN_M02

HTB Sales Training 2003Aug12 ORACLE Slide 35

## Patient Administration

Description	Trigger Event	Structure
Patient admitted and assigned to a bed	A01 – Admit/Visit Notification	ADT_A01
Patient has arrived or checked in	A04 – Register a Patient	ADT_A01
Other change in patient information	A08 – Update Patient Information	ADT_A01
Discharge or end visit event is canceled	A13 – Cancel Discharge/End Visit	ADT_A01
Physical location for a patient is changed	A02 – Transfer a Patient	ADT_A02
End of a patient's stay in a healthcare facility	A03 – Discharge/End Visit	ADT_A03
Patient undergoes the pre-admission process	A05 – Pre Admit a Patient	ADT_A05
Patient admitted during a non-admitted visit	A06 – Change an Outpatient to an Inpatient	ADT_A06
Patient discharged without closing episode of care	A07 – Change an Inpatient to an Outpatient	ADT_A06
Admission event is canceled	A11 – Cancel Admit/Visit Notification	ADT_A09
Admitted patient has left the healthcare institution temporarily	A21 – Patient Goes on a Leave of Absence	ADT_A21
Admitted patient has returned after a temporary "leave of absence"	A22 – Patient Returns From a Leave of Absence	ADT_A21

HTB Sales Training 2003Aug12 ORACLE Slide 36

## Observation Event

Description	Trigger Event	Structure
Update the bed status	A20 – Bed Status Update	ADT_A20
Person's/patient's allergy information has changed	A60 – Update Adverse Reaction Information	ADT_A60
Correct/revises an observation	R01 – Unsolicited observation message	ORU_R01
Mark an observation as entered in error	R01 – Unsolicited observation message	ORU_R01
Designate that the observation is final	R01 – Unsolicited observation message	ORU_R01
Specimen received by lab but results are not available	R01 – Unsolicited observation message	ORU_R01
Results "preliminary"	R01 – Unsolicited observation message	ORU_R01
Results "unverified"	R01 – Unsolicited observation message	ORU_R01
Results partially unverified	R01 – Unsolicited observation message	ORU_R01

HTB Sales Training 2003Aug12 ORACLE Slide 37

## Observation Order

Description	Trigger Event	Structure
Create an active verified order	O01 – General OrderMessage	ORM_O01
Create an unverified order	O01 – General OrderMessage	ORM_O01
Cancel an active verified order	O01 – General OrderMessage	ORM_O01
Cancel an unverified order	O01 – General OrderMessage	ORM_O01
Discontinue an active order	O01 – General OrderMessage	ORM_O01
Discontinue an unverified order	O01 – General OrderMessage	ORM_O01
Suspend an active order	O01 – General OrderMessage	ORM_O01
Release suspended order	O01 – General OrderMessage	ORM_O01
Create completed order	O01 – General OrderMessage	ORM_O01
Unverified order is verified	O01 – General OrderMessage	ORM_O01
Revise an active order	O01 – General OrderMessage	ORM_O01
Revise an unverified order	O01 – General OrderMessage	ORM_O01

HTB Sales Training 2003Aug12

ORACLE

Slide 38

## Patient Problem

Description	Trigger Event	Structure
Clinician enters patient problem	PC1 – Add patient problem	PPR_PC1
Clinician updates patient problem information	PC2 – Update patient problem	PPR_PC1
Clinician terminates patient problem	PC3 – Delete patient problem	PPR_PC1

HTB Sales Training 2003Aug12

ORACLE

Slide 39

## HL7 v3.0 Messages

### Scope

#### Administrative Act Types

- Person Registry
- Patient Registry
- Staff Registry
- Encounter Event
- Encounter Appointment

#### Clinical Act Types

- Observation Order
- Procedure: Event & Order
- Observation event
  - lab results, vital signs...
  - transcribed reports
  - allergies
  - problems & diagnosis

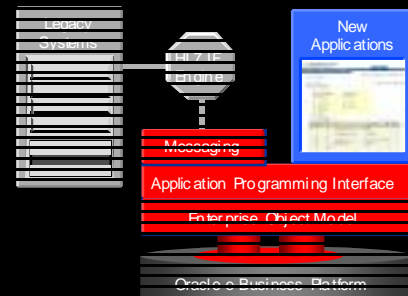
HTB Sales Training 2003Aug12

ORACLE

Slide 40

## Business Process Support

### Release 1 API

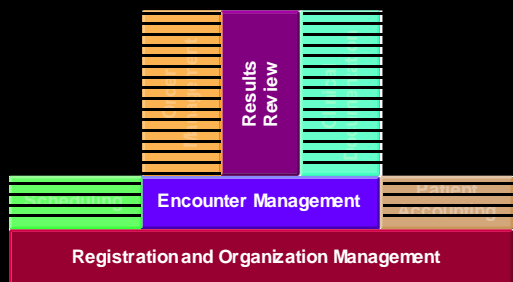


HTB Sales Training 2003Aug12

ORACLE

Slide 41

## Business Process Functionality



HTB Sales Training 2003Aug12

ORACLE

Slide 42

## Business Process Scope

### First release

- Encounter management
- Organization management
- Care site management
- Patient registration
- Patient lists management
- Staff management
- Storage and retrieval of
  - Events
  - Observations
  - Results
  - Orders

HTB Sales Training 2003Aug12

ORACLE

Slide 43

## Business Process API

### Encounter management



- Creating, updating and ending an encounter
- Checking in and checking out a patient
- Admitting, re-admitting, transferring & discharging a patient
- Canceling an admit, re-admit, discharge & transfer
- Updating activities that were entered in error
- Updating and canceling a patient marking as deceased
- Creating a Newborn
- Reassigning an encounter prior to Check-in
- Marking and canceling a *No Show*
- Finding an encounter and all linked encounters
- Retrieving an encounter history

HTB Sales Training 2003Aug12

ORACLE

Slide 44

## Business Process API

### Organization Management



- Management of organization definition
- Creating and updating of organizational units
- Creating and updating of care sites
- Assignment of care site to practice settings
- Retrieval of organizational units
- Retrieval of care sites

HTB Sales Training 2003Aug12

ORACLE

Slide 45

## Business Process API

### Care Site Management



- Updating care site status
- Finding available care sites
- Retrieving care site details
- Reserving a care site

HTB Sales Training 2003Aug12

ORACLE

Slide 46

## Business Process API

### Patient Management



- Creating and updating a Patient
- Creating and updating a medical record
- Managing a medical record number
- Creating, updating and retrieving:
  - primary care provider
  - insurance information
  - employer

HTB Sales Training 2003Aug12

ORACLE

Slide 47

## Business Process API

### Patient List Management



- Creating a patient list based on
  - location
  - medical service
  - encounter
- Creating a manual patient list
- Adding and removing patients from a manual patient list
- Adding and removing columns from a patient list
- Retrieving a patient list

HTB Sales Training 2003Aug12

ORACLE

Slide 48

## Business Process API

### Staff Management



- Staff registration
- Staff search
- Creating and maintaining workgroups
- Workgroup search
- Creating, updating and terminating staff assignments

HTB Sales Training 2003Aug12

ORACLE

Slide 49

## Business Process API Clinical data

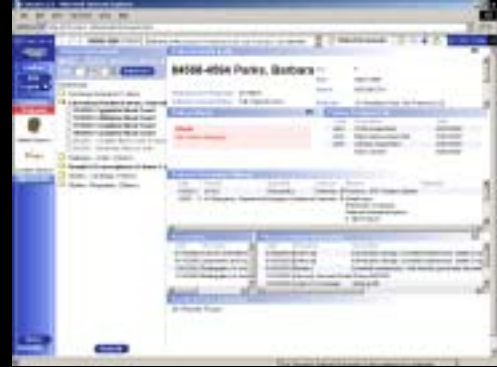
- Storage of Events, Observations, Results and Orders
- Retrieval of Events, Observations, Results and Orders
- Definition and use of a Master Catalog
- Definition and use of User Catalogs

HTB Sales Training 2003Aug12

ORACLE

Slide 50

## Results Reporting Application Orion



HTB Sales Training 2003Aug12

ORACLE

Slide 51

## Outline

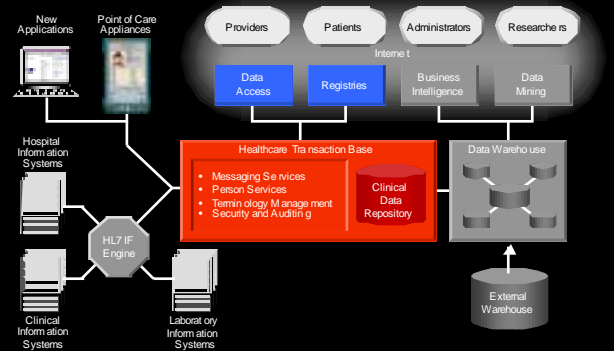
- Product vision
- Product features
- Current projects
- Roadmap

HTB Sales Training 2003Aug12

ORACLE

Slide 52

## Healthcare Transaction Base Infrastructure platform

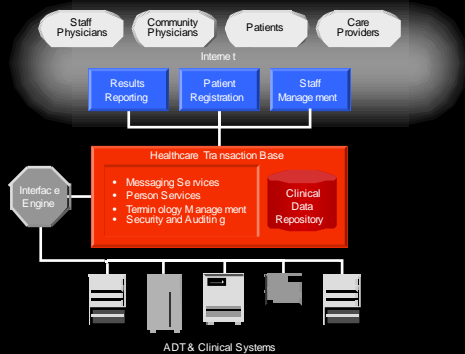


HTB Sales Training 2003Aug12

ORACLE

Slide 53

## Integrated Delivery Network Community access model

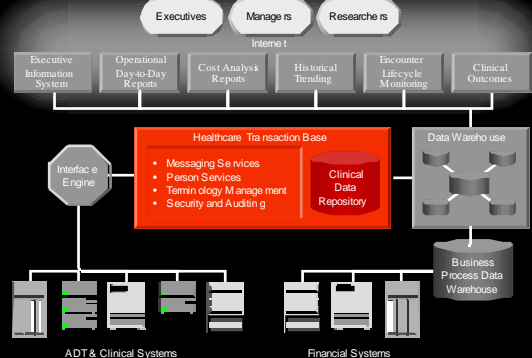


HTB Sales Training 2003Aug12

ORACLE

Slide 54

## Integrated Delivery Network Centralized decision support



HTB Sales Training 2003Aug12

ORACLE

Slide 55

