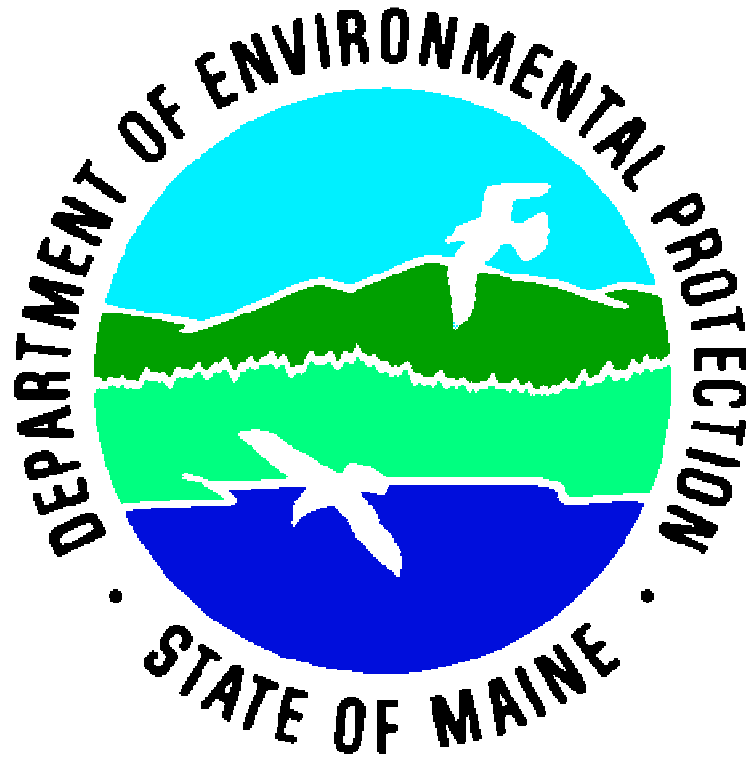
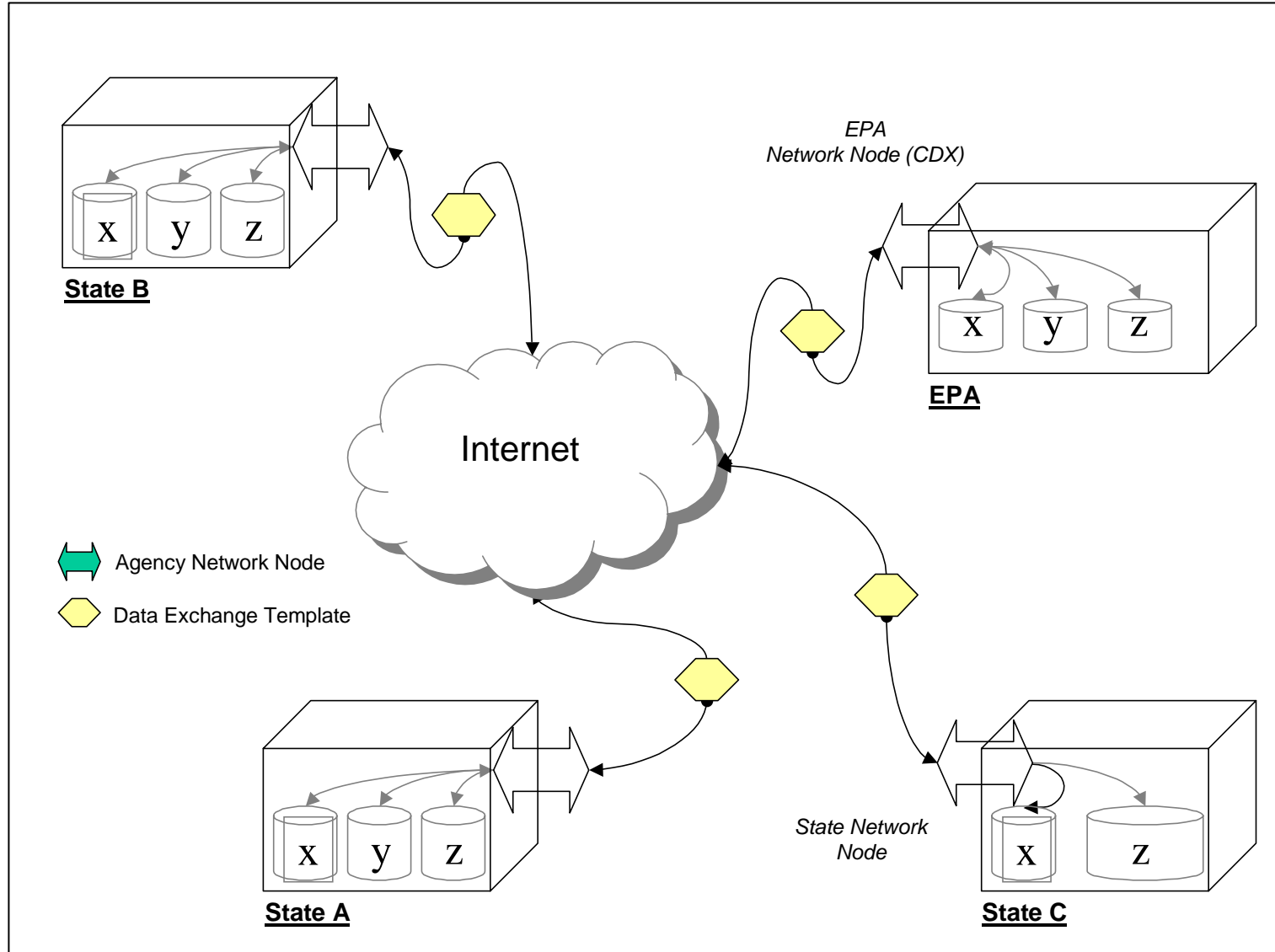


# Maine Oracle 9iAS Node &

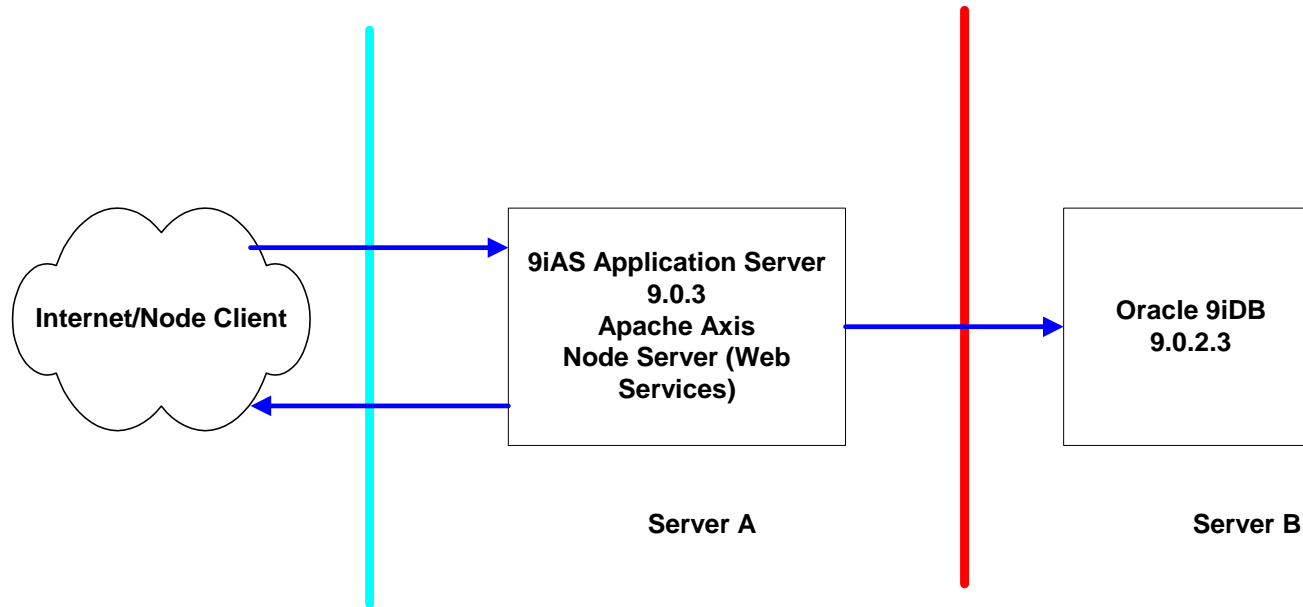


## Demonstrated Node Configuration (DNC)

# Exchange Network Architecture

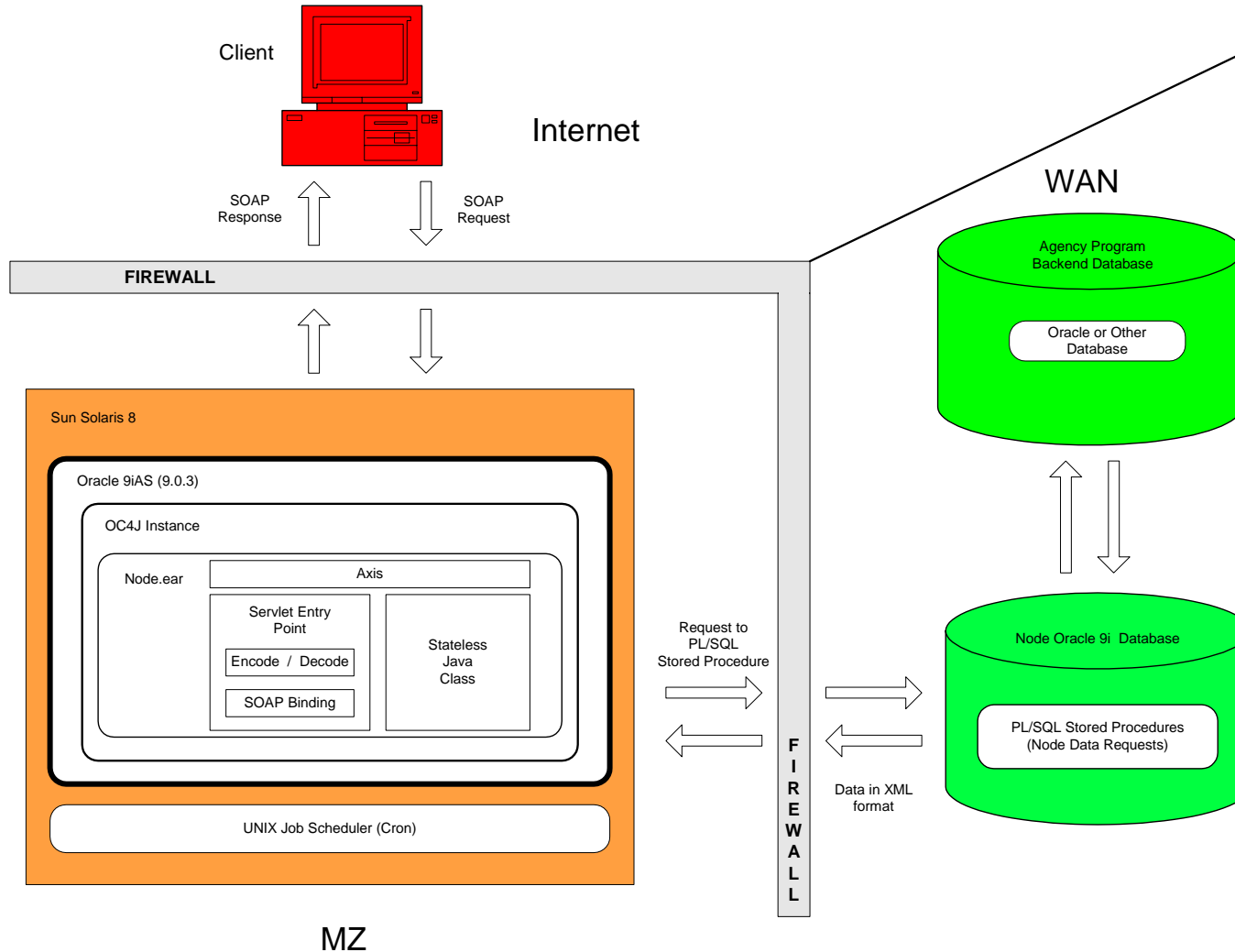


# Simplified Node Architecture View



# Node Architecture

## Node Architecture



# Maine's Oracle 9iAS

## Middleware Breakout Session

- High-Level Architecture Diagrams
- The Node Technology Stack
- Why Maine Chose Oracle 9iAS
- Why Maine Contracted with Oracle Corp.
- Practical Experiences with 9iAS
- Testing the Node & the Data Requests
- Using the Node to Flow Data
- Lower-Level Architecture Diagrams
- Maine's Oracle 9iAS DNC
- Questions

# The Node Technology Stack

- The technology stack being used in the Oracle Node v1.1 includes UDDI, WSDL, SOAP, DIME, XML, Java, Oracle 9iAS R2 middleware, and Oracle JDeveloper as the development environment.
- This is a rapidly changing set of cutting-edge software. Frequent training is needed to keep Node support staff and developers current with new releases of each technology.

# The Node Technology Stack

- NEIEN, a.k.a. the Exchange Network (EN), has pledged to use W3C standards whenever they exist so it will remain an open solution using the latest technology for secure transmittal of XML-formatted environmental information.

# The Node Technology Stack

- The developer of an Oracle 9iAS Node should have the following skill set:
  - a. Java, J2EE, PL/SQL
  - b. Oracle 9iAS J2EE deployment
  - c. Apache Axis
  - d. JDeveloper
  - e. UNIX or Cron knowledge
  - f. Web Services knowledge

Note: no mention of XML, UDDI, WSDL, SOAP, HTML.

# Status of UDDI re: EN Nodes

- UDDI is not required for Node v1.1 compliance. Neither the Registry nor the UDDI server were in place in time to be included in v1.1.
- CDX's UDDI server is running and available to nodes.
- UDDI services are integrated into the Node Client SDK which can dynamically discover/determine Node addresses registered in the Registry.
- More info: <https://uddi.epacdxnode.net>.
- EN Registry is a separate EN development effort, including more than just UDDI.

# Practical Experiences With 9iAS

## Project Management View of Maine's Experience

- Experience-based Reality Check
- Details of Maine's Practical Experience –  
Node work from A to Z

# Practical Experiences With 9iAS

## Project Management View of Maine's Experience

### **Experience-based Reality Check**

- 12/02 NSB document "Suggested Activities for Getting Started"
  - Pervasive changes take more time and money than expected—start now!
- Node v1.1 is not a finished product.
- Hire a consultant, if only on an as-needed basis.
- CDX node test tool is great, but it is not the real world. You need to test with live nodes.

# Practical Experiences With 9iAS

## Project Management View of Maine's Experience

### **Experience-based Reality Check**

- Protocol and Functional Specification v1.1 documents are forward looking in places, but the non-required features are not identified as such in the documents.
- Functional Specifications, i.e., requirements, are cast in Jell-o, not concrete. Expect rework due to changes in "requirements".
- Node v1.1 requirements do not include the many local application coding tasks needed to make the Node usable.

# Practical Experiences With 9iAS

## Project Management View of Maine's Experience

### **Experience-based Reality Check**

- Local features of the node were absent from the Node 1.0 project scope and, therefore, lacked funding. EPA focus is interested in getting data to EPA.
  - user interfaces, logging access and usage, application security, transaction ID generation and use, UDDI registry, an automated scheduler, DII.

# Practical Experiences With 9iAS

## Project Management View of Maine's Experience

### **Combined ME and FL Effort & Cost**

\*\* This is what the DNC will save you! \*\*

■ Project Management & Systems Analysis	115 hours	\$ 9,200
■ Programmers	755 hours	\$ 43,800
■ Oracle consultants	200 hours	\$ 50,000
<b>TOTAL</b>	<b>1,070 hours</b>	<b>\$103,000</b>

[Total does not include costs of infrastructure setup or CSC's Axis work-around assistance of 3 days.]

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

### Why Oracle 9iAS?

- Thorough comparative review in the 9/2/02 *eWeek* magazine rated Oracle 9iAS Release 2 middleware #1 when compared with its most direct competitors, IBM and BEA.
- Maine DEP hired the Bureau of Information Services (in-house operations, network, and development services for State agencies), an Oracle database and development shop.
- Oracle had directly relevant experience through their work with the FL beta node and related interactions with EPA.

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

### **Why Oracle 9iAS?**

- Oracle 9iAS R2, a.k.a 9.0.2, is a bundle of software functionality sold as a labor-saving, cost effective unit. It includes several wizards that relieve users from doing most/all of the coding in SOAP and WSDL. FL noted that the most time-intensive part of setting up their beta node using 9iAS R1 dealt with SOAP and WSDL code which they had to write manually. Oracle included wizards and other features in Release 2 to simplify these and other tasks for EN Node builders.

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

### **Why Oracle 9iAS?**

- The considerable benefits of a single-vendor solution are attractive, e.g., less software administration, faster throughput, no integration issues with various software packages and the database, lower cost since we already owned the software.

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

### **Why Maine Contracted with Oracle Corp.**

- No one knows the Oracle software better than Oracle consultants.
- No one has better contacts with Oracle Development than Oracle consultants.
- Oracle has directly relevant experience through their work with the FL beta node and related interactions with EPA.
- We wanted the best support available for the Node 1.0 "proof of concept" Project.

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

### Current Node Infrastructure Environment

- Database Server:

- Platform: Sun Sparc Solaris
- Operating System Version: Solaris 8

- Application Server:

- Platform: Sun Sparc Solaris
- Operating System Version: Solaris 8

- Developer's Computer:

- Operating System Version: Windows 2000

# Practical Experiences With 9iAS

Technical Details of Maine's Practical Experience

## Installation of Oracle Software

- Needed to upgrade versions of our existing AS to best support the Node.
- AS – 2 days to install 9.0.3
- DB server – 1 day to install
- Node Development – 1070 hours
- DNC – unknown until next week

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

### **Configuring the Software**

- Configuration within the state WAN was not a problem.
- Oracle Wallet Manager was a problem. You just have to know how to use it!
- JDeveloper install was easy, but its deployment and short-comings were extremely time-consuming. Note our lessons learned in the DNC.
- Work-Arounds for Oracle Short-comings.

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

- Node Development Staffing
  - Maine used a DBA/AS administrator (incidental use), one project manager (35-40%), and one programmer (35-40%).
  - Paid contractor assistance – Oracle and CSC.
  - Maine Node staff had very little or no experience with the technology stack used by the Node. A lot of self-study, knowledge transfer from FL beta Node staff and Oracle, plus months of frustrating trial-and-error got us where we are today. 😊
  - Where we are today re: experience.

# Practical Experiences With 9iAS

## Technical Details of Maine's Practical Experience

- Node Development Staffing
  - Plenty of training opportunities are available for Oracle products, Java, XML-based languages. State travel and training restrictions also abound due to budget problems.

# Testing the Node & Data Requests

- CDX Integrated Test Tool
- Other Nodes, CDX and State
- Test database table included in our DNC
- 5 FRS Data Requests included in our DNC

# Using the Node – Setting up Data Flows

- Maine is behind in its original plan to move to an integrated environmental information system. We went ahead with the Web side of the Maine Node to build experience and to make certain that an Oracle platform was included in the Node 1.0 Project. We have been using some primitive test data, but do not expect to flow data using our legacy systems.
- In this area, Maine is a mentee, not mentor.

# Using the Node – Setting up Data Flows

- Oracle Comments on:
  - 9iAS Ease of Use
  - Will 9iAS Map Data to a Schema? OWB?
  - Other Features of 9iAS that Maine is not Using?
  - Oracle Experience with 9iAS
    - How long have you been using it?
    - Have you done other EN Node work using 9iAS for either EPA or other states?

# Maine's Oracle DNC

- Full-bodied Demonstrated Node Configuration (DNC), not just a Node "stub".
- Maine's Oracle 9iAS DNC can be downloaded from the EN Web site: [www.exchangenetwork.net](http://www.exchangenetwork.net).

# DNC & Contractor Support

- If states adopt the Demonstrated Node Configuration, they will still need contractor support to move forward, unless they have in-house experts in the Node technology stack. Passing the CDX testing tool doesn't guarantee that states won't have problems interacting with CDX or other Nodes.

# Maine's Next Steps

- 1. Test with CDX, NE, DE, NH, and others for two-way and server operating system interoperability.
- 2. If CDX releases any of the “shareware” scripts and code packages they show us at this Workshop, we will try to incorporate them in our Node and in an updated DNC.
- 3. Funding and time permitting, once Oracle 10gAS 10.0.3 is out AND supports DIME, rebuild the

Node using 10g without the Axis and Xerces overlays used in the “Axis Node“. Issue a DNC v2 based on 10g.

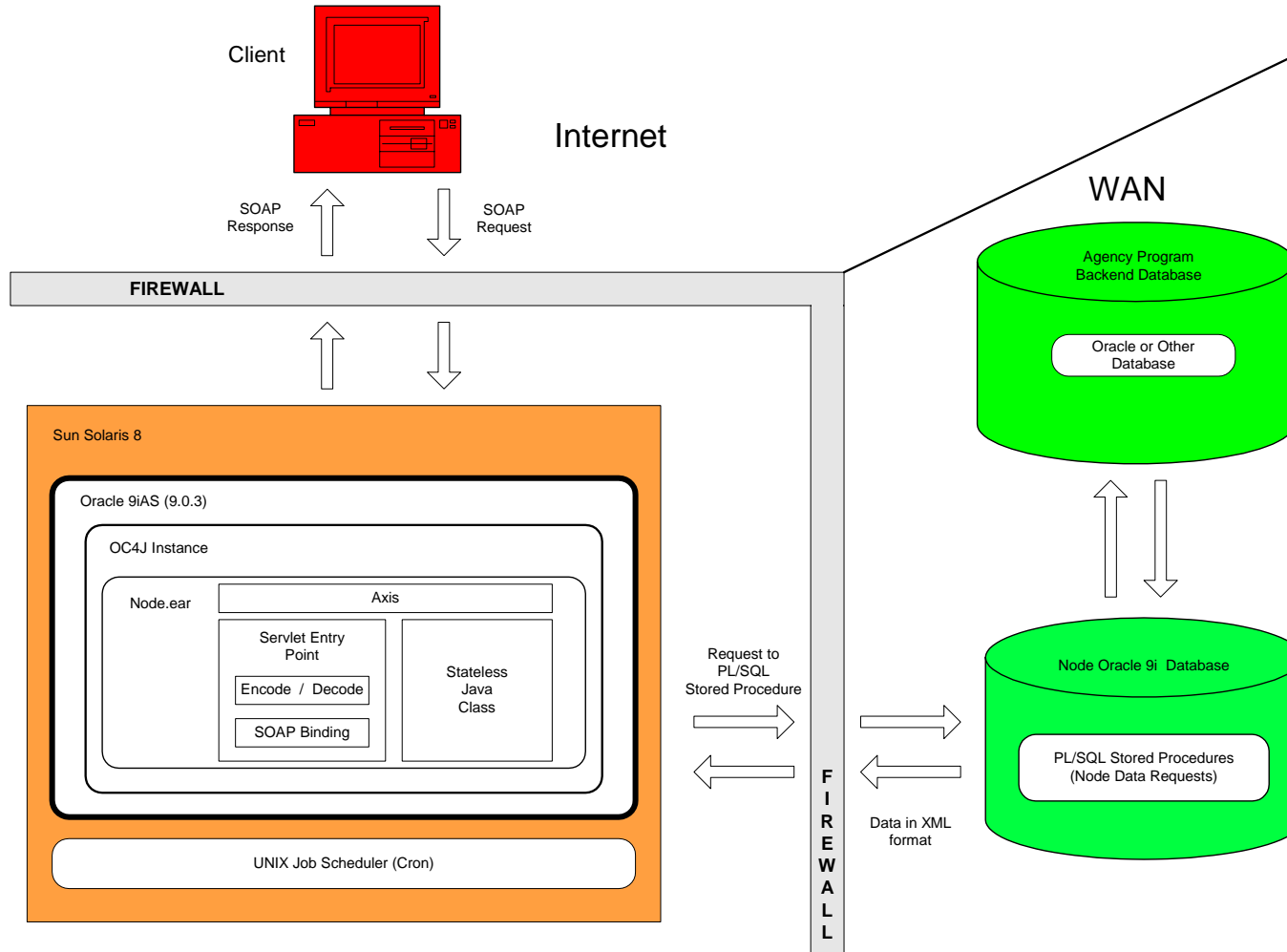
This would give Oracle states two DNC approaches to implementing a node using the JDeveloper toolset -- 9iAS with Axis overlays or 10gAS straight Oracle. Either way, the Oracle database version will have to be 9i or newer -- we are not planning to support database versions 7 and 8.

# Maine's Next Steps

- 4. Develop the v1.1 facility data request GetFacilityBySICCode.
- 5. Test using NAAS for facility and lab registration for facility-to-state data transmissions.
- 6. Decide on an ETL tool to assist in data mapping and cleaning.
- 7. Map backend data to flat files or XML schema and vice versa (ready to flow via the EN node).
- 8. Code 4 Service (Data) Requests for NEI data.
- 9. Enhance local functionality as resource availability and funding allow.
- 10. Upgrade Oracle Application Server to 10gAS 10.0.3.
- 11. Upgrade BIS' Oracle development database to 9.2.0.4.0.

# Node Architecture

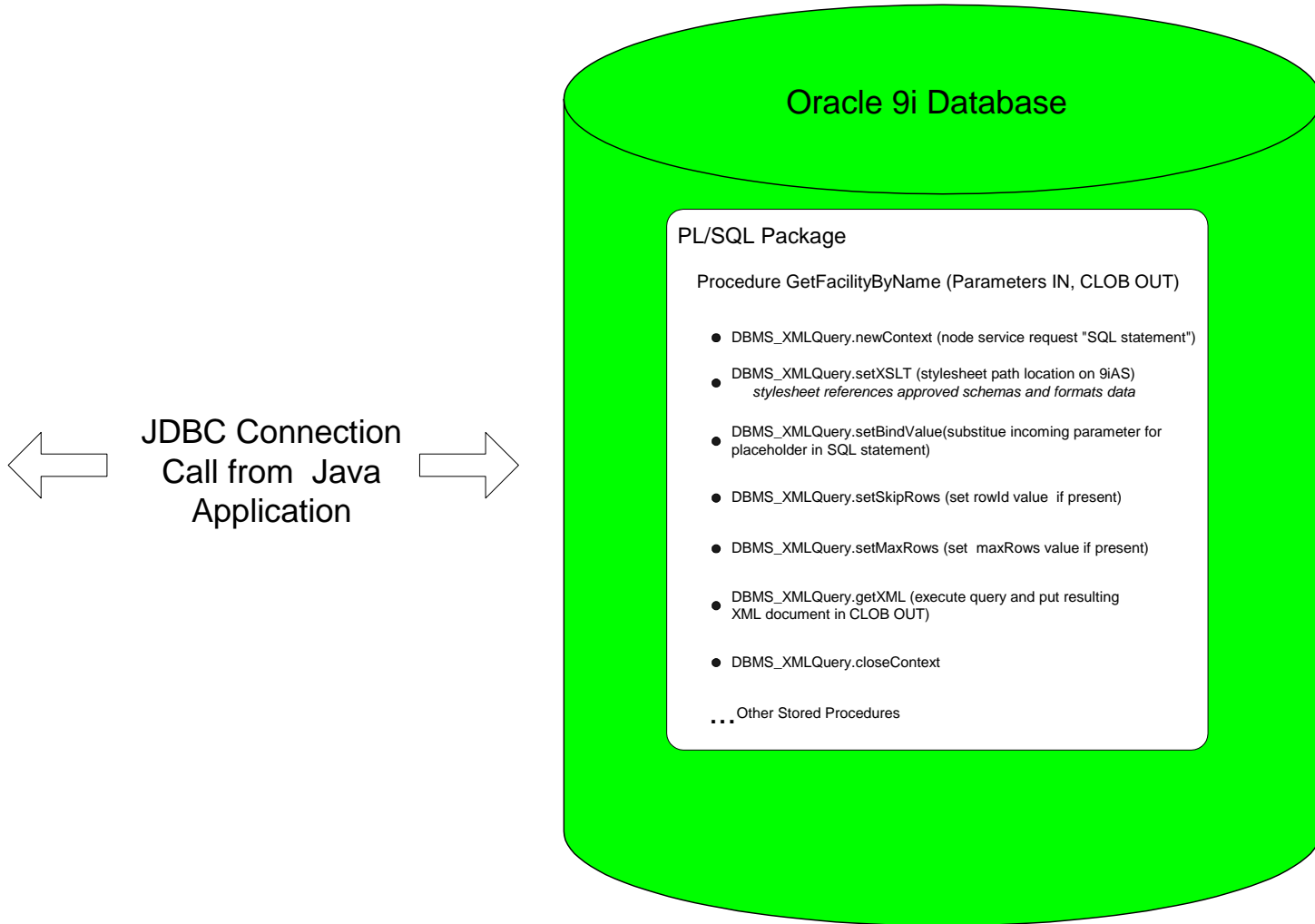
## Node Architecture



MZ

# Data Request Processing

## Data Request Processing



# Solicit Method Processing

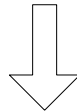
## Solicit method backend processing

### Solicit method Invoked

Service Request and Parameters Inserted into Database

Trigger fires on insert, placing Job in Solicit\_Job\_Queue (AQ) table

transactionId Returned to callee Node



### UNIX Job Scheduler (Cron calls a SQL script and an executable .jar file)

#### Script (calls PL/SQL stored procedures)

SCHEDULER.STOP('SOLICIT\_JOB\_QUEUE') - Places "Stop" flag in this queue.

SCHEDULER.RUN('SOLICIT\_JOB\_QUEUE') - Processes jobs in queue, updating transaction status, putting XML documents in table for pick up and placing a job in the SUBMIT\_JOB\_QUEUE.

STOP\_SUBMITLISTENER('SUBMIT\_JOB\_QUEUE') - Places "Stop" flag in this queue.

#### Script (calls executable .jar file)

SubmitListener.class instantiated

- SUBMIT\_JOB\_QUEUE queried for Jobs
- When record found, Download table queried for parameters to fill NodeDocument object
- INCOMING\_SOLICIT table queried for returnUrl
- returnUrl used to instantiate a stub to the called Node
- SubmitListener Authenticates against the Node
- SubmitListener calls Submit method, pushing the NodeDocument to the callee Node



**Questions?**