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## 1.0 Release Notes

The HLN Consulting Immunization Calculation Engine (ICE) Forecaster is a Clinical Decision Support (CDS) engine built on the OpenCDS platform (<http://www.opencds.org/>) and provides immunization forecasting to health information systems.

Detailed technical information on how the ICE Forecaster works, release notes, and documentation can be found at <https://www.hln.com/ice/>.

The ICE Forecaster runs as an independent service that is used by the Indian Health Service (IHS) Resource and Patient Management System (RPMS) to get an evaluation of the immunizations and the next doses recommended for a patient.

The ICE Forecaster can be deployed locally, even on the same system where RPMS is installed. It can also be deployed centrally and accessed remotely if desired.

## 2.0 Requirements

The server where the ICE Forecaster will be installed must meet the following requirements:

1. Must be accessible from all systems where RPMS or RPMS EHR will be used to generate or view immunization forecasts.
2. Must have a supported Operating System: Windows Server 2012 or newer, or AIX 7 or newer.
3. Must have at least 2.5GB of system RAM available for ICE to use at all times.

**Note:** This requirement is for available RAM, not total system RAM. If 32GB of RAM is installed in the server and 31GB of RAM could potentially be in use the server does not meet the minimum requirement.

### 2.1 Java

A supported version of Java is required. For information on installing Java see Section 3.0.

Supported Version:

- Oracle Java 1.8 64-bit
- OpenJDK 8 64-bit

### 2.2 Tomcat

A supported version of Apache Tomcat is required. For information on installing Tomcat see Section 3.0 Installing the ICE Forecaster.

Supported Version:

- Apache Tomcat 9 64-bit

### 2.3 Immunization Tracking System (BI)

BI version 8.5 patch 1003 or newer must be installed on the RPMS server.





4. Click **Download Java**.
5. Run the downloaded file to install Java 1.8.

To install OpenJDK version 8 on Windows:

1. Navigate to <https://adoptium.net/temurin/releases/?os=windows&arch=x64&version=8&package=jdk>.
2. Click the button to download the .msi version.
3. Run the downloaded file to install OpenJDK 8.

### 3.2.1.2 When a 64-bit version of Java 1.8 or OpenJDK 8 is currently installed

A compatible version of Java is already installed, and installation may proceed at Section 3.2.2.

### 3.2.1.3 When a 32-bit version of Java is currently installed

Because ICE requires more system memory than a 32-bit version of Java can supply, it is necessary to ensure that a 64-bit installation of Java is available. Instructions on the process of updating from a 32-bit version of Java to a 64-bit version of Java can be found in section 7.0.

## 3.2.2 Step 2: Install Tomcat

Navigate to <http://tomcat.apache.org/download-90.cgi>.

Select the 32-bit/64bit Windows Service Installer.

Install the application, following all standard installation prompts. It is recommended that the default installation path be used.

## 3.2.3 Step 3: Update the Tomcat Configuration

Before installing the ICE Forecaster, it is necessary to modify the Tomcat configuration settings to ensure proper operation of Tomcat and ICE.

1. Navigate to the Tomcat/bin directory (by default this is **C:\Program Files\Apache Software Foundation\Tomcat 9.0\bin**).
2. Double-click the **Tomcat9w.exe** executable. Click **Yes** if the **User Account Control** box displays.
3. Select the **Java** tab.





4. Navigate to **C:\ICE** and run the file **ICE Installation Manager.exe**. You may be asked to provide Tomcat's location to the installer if Tomcat was installed to a non-default location.
5. Click the **Install** button and follow the prompts. You will be asked to verify the install path to ensure it is correct. Close the application when the installation is completed.

### 3.2.5 Step 5: Installation Verification

Table 3-1: Installation Verification Steps

Completed?	Steps
<input type="checkbox"/>	Java is installed
<input type="checkbox"/>	Tomcat is installed
<input type="checkbox"/>	Tomcat Configuration has been updated
<input type="checkbox"/>	ICE Forecaster is installed

## 3.3 AIX Installation

**Formatting Note:** This section contains terminal snippets which include a shell prompt character at the beginning of each input line (#) (Figure 3-5).

```
# uname
AIX
```

Figure 3-5: Terminal snippet example

The shell prompt character is intended to make clear which lines are console input and which are the output of console commands. When entering commands, or pasting commands into the terminal, this shell prompt character should be excluded.

**Path Note:** During the installation and configuration process there are several default paths which will be referenced. If using an existing installation which is placed in a different directory, or if you wish to install something to a different directory than the listed default, you may do so and replace all references to the default path in these instructions with the path where the resource is located on your system. Your Java JRE directory may vary depending on your Java version.

#### Default Paths:

- **Java 8 JRE:** /usr/java8\_64/jre
- **Tomcat 9:** /usr4/tomcat9
- **ICE:** /usr4/ice



















### 7.2.3 Install Java and Migrate Tomcat to 64-bit

1. Follow the Java installation process detailed in Section 3.2.1.1.
2. Uninstall Tomcat (if it is currently installed).
3. Follow the Tomcat installation process detailed in Section 3.2.2.
4. Now that a 64-bit version of Java is installed, the Tomcat installer will detect 64-bit Java and install the 64-bit version of Tomcat.
5. If Tomcat was installed previously, copy all files and folders in the webapps directory backed up in Section 7.2.1 above and paste them into the new 64-bit Tomcat webapps directory (C:\Program Files\Apache Software Foundation\Tomcat 9.0\webapps).
6. Stop the Tomcat service in the Services management panel.
7. Open the ICE installer directory (C:\ICE) and look for the file “tomcat.path”. If this file is present, delete it.
8. Proceed with the ICE install or update process.

## 8.0 Upgrading to a new version of Tomcat

The process for upgrading to a new version of Tomcat is outlined sequentially below. Follow each step in the order it appears.

### 8.1 Stop the Old Version of Tomcat

Before the new version of Tomcat can be started, the old version must be stopped.

In Windows, stop the old Tomcat version's service in the Services management panel and set the service startup type to **Manual** to prevent it from starting automatically.

In AIX, go to the old Tomcat version's folder, enter the "bin" directory, and run the file **shutdown.sh**.

### 8.2 Uninstall the Old Version of Tomcat (Windows)

A new version of the Tomcat application cannot be installed on Windows until the previous version is removed. Please uninstall the application through the Windows "Apps and Features" utility before proceeding.

When prompted if you wish to "**Remove all files in your Apache Tomcat 9.0 Tomcat9 directory?**" select "No".

### 8.3 Install the New Version of Tomcat

Follow the instructions for installing and configuring Tomcat:

**Windows:** Sections 3.2.2 and 3.2.3.

**AIX:** Section 3.3.2.1.

### 8.4 Update ICE Updater Path

The ICE Forecaster installer tracks the location of Tomcat so updates can be applied to the correct location even if Tomcat is installed in a non-default location or multiple instances of Tomcat exist on the server.

To direct the ICE Forecaster installer/updater to the new Tomcat location, go to the ICE installer folder and replace the contents of the file "tomcat.path" with the path to the new Tomcat installation.

### 8.5 Run the ICE Installer

To install ICE to the new version of Tomcat, follow the instructions in Section 4.0.











### 9.2.4.2 AIX

While logged in as root, run the command:

```
lsof -i :{port}
```

Figure 9-6: Port availability command

Where {port} is the port number Tomcat is configured to use.

If the output is empty, the port is free for Tomcat to use. If the port is already in use, the second column of the output will contain the PID of the process which is using the port.

```
# lsof -i :8080
COMMAND PID  USER  FD  TYPE DEVICE SIZE/OFF NODE NAME
java     981  tomcat 56u  IPv4 25141      0t0  TCP *:http-alt (LISTEN)
```

Figure 9-7: Identifying the PID of the process

## 9.3 Tomcat Is Running but Immunization Forecasts Cannot Be Generated

To verify that the ICE Forecaster is running, please follow steps outlined in Section 5.0.

If ICE is not running, please restart Tomcat. If the issue persists, please open a support ticket for further assistance.

## 10.0 Default Paths and Names

This section contains the file names and default paths for ICE, Tomcat, and Java. These may be referenced to quickly locate a path or file.

### 10.1 Windows

Table 10-1: ICE

Item	Default Path
Distribution File	ICE 1.42.1.4.zip
Installer Folder	C:\ICE
Installer Executable	ICE Installation Manager.exe

Table 10-2: Tomcat

Item	Default Path
Install Folder	C:\Program Files\Apache Software Foundation\Tomcat 9.0
Config Executable	Tomcat9w.exe

Table 10-3: Java

Item	Default Path
Install Folder	C:\Program Files\Java\

## Glossary

### **Immunization Forecaster**

A software that, when provided with patient disease and immunization history, provides a schedule of upcoming or due immunizations.

### **Resource and Patient Management System**

A decentralized integrated solution for management of both clinical and administrative information in these healthcare facilities. Flexible hardware configurations, over 50 software applications, and network communication components combine to create a comprehensive clinical, financial, and administrative solution; a solution that can stand alone or function in concert with other components as needed. Professionals in American Indian, Alaska Native, and private sector health facilities use RPMS every day to efficiently manage programs, maximize revenue generation, and most important, to provide high-quality care for patients.

### **Tomcat Webserver**

A web hosting software provided by the Apache Software Foundation used to host websites and web applications.

## Acronym List

<b>Acronym</b>	<b>Term Meaning</b>
CDS	Clinical Decision Support
FTP	File Transfer Protocol
ICE	Immunization Calculation Engine
IHS	Indian Health Service
JRE	Java Runtime Environment
OIT	Office of Information Technology
RPMS	Resource and Patient Management System
SMM	Simple Message Mover
TCH	Texas Children's Hospital

## Contact Information

If you have any questions or comments regarding this distribution, please contact the IHS IT Service Desk.

**Phone:** (888) 830-7280 (toll free)

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