THE EDWARD MALLINCKRODT INSTITUTE OF RADIOLOGY

Washington University in St. Louis
SCHOOL OF MEDICINE
MIR Mallinckrodt Institute of Radiology

# Application Hosting

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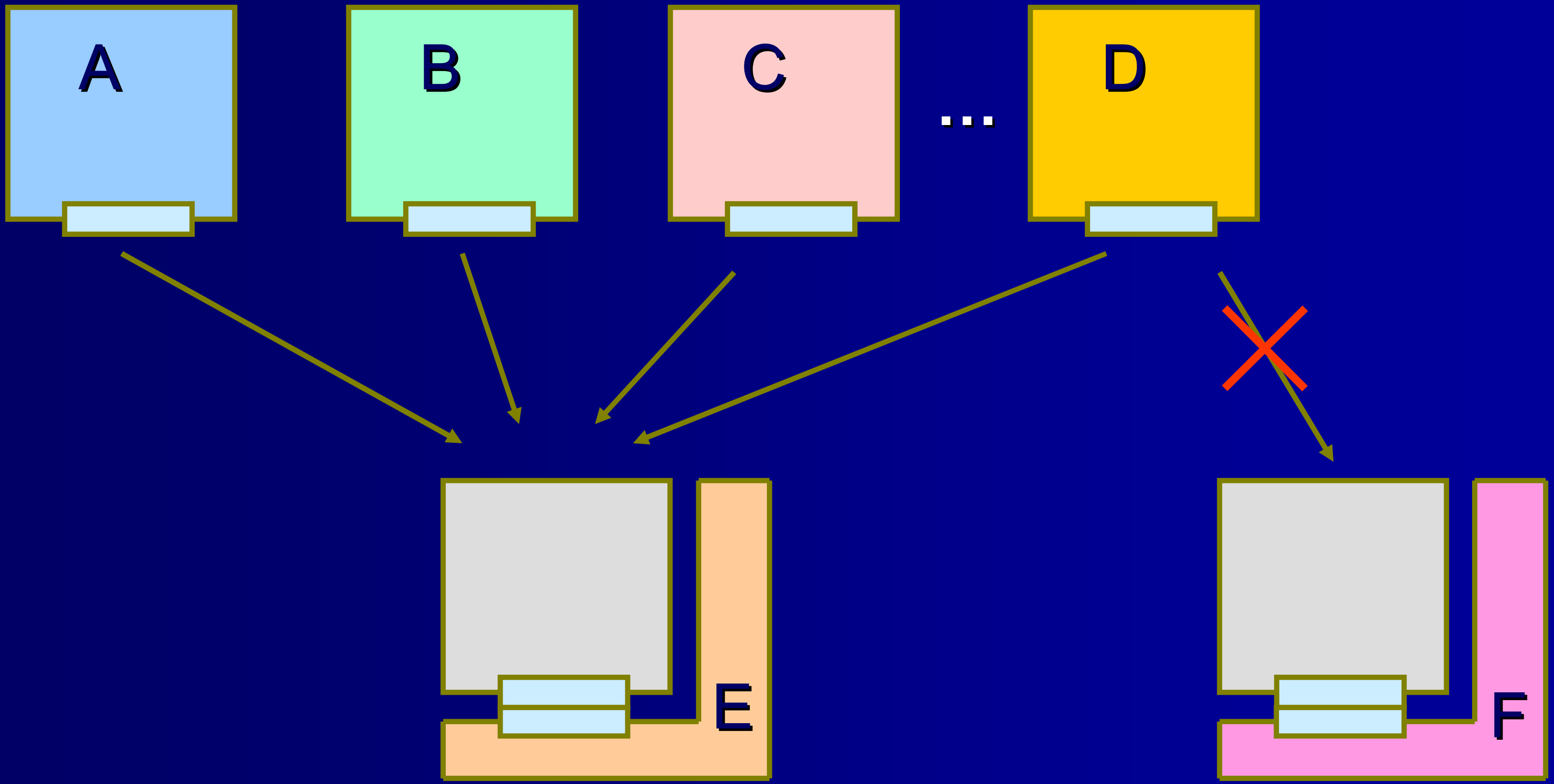
DICOM℠
Digital Imaging and Communications in Medicine

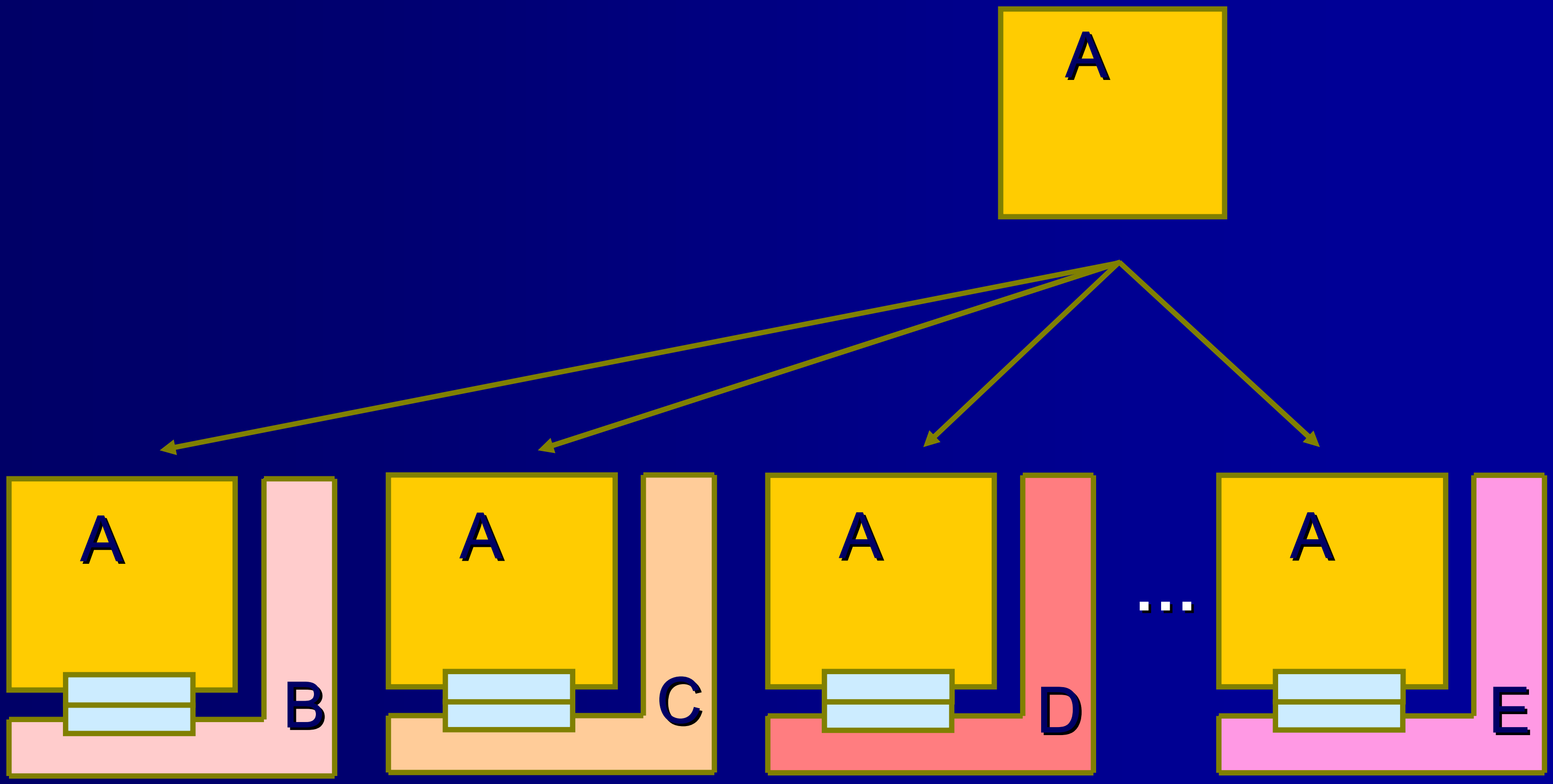
# Targets

- Standardized API for Interchanging Data Between Two Applications
  - Hosting Application launches a Hosted Application
  - Data inputs and outputs described using DICOM Semantics
  - DICOM messages/objects may not be used directly, instead the API may give access to parts of the objects
- Meta-data to Describe an Application
  - Type of application
  - Expected input data
  - Output data generated
  - Resources needed by the application
  - Version, license restrictions, etc.
  - Validation results

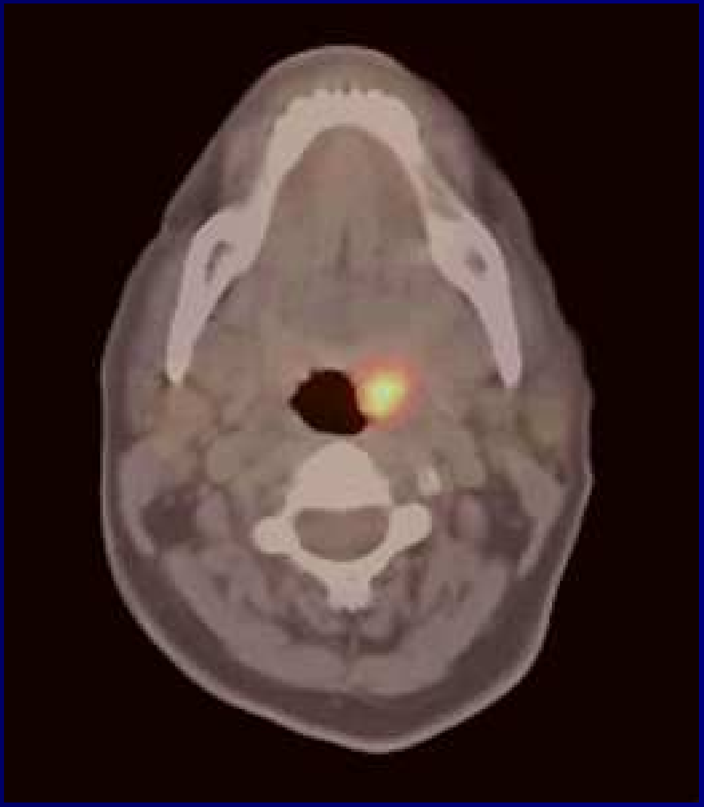
# Typical Plug-in Concept



# Extended Plug-in Concept

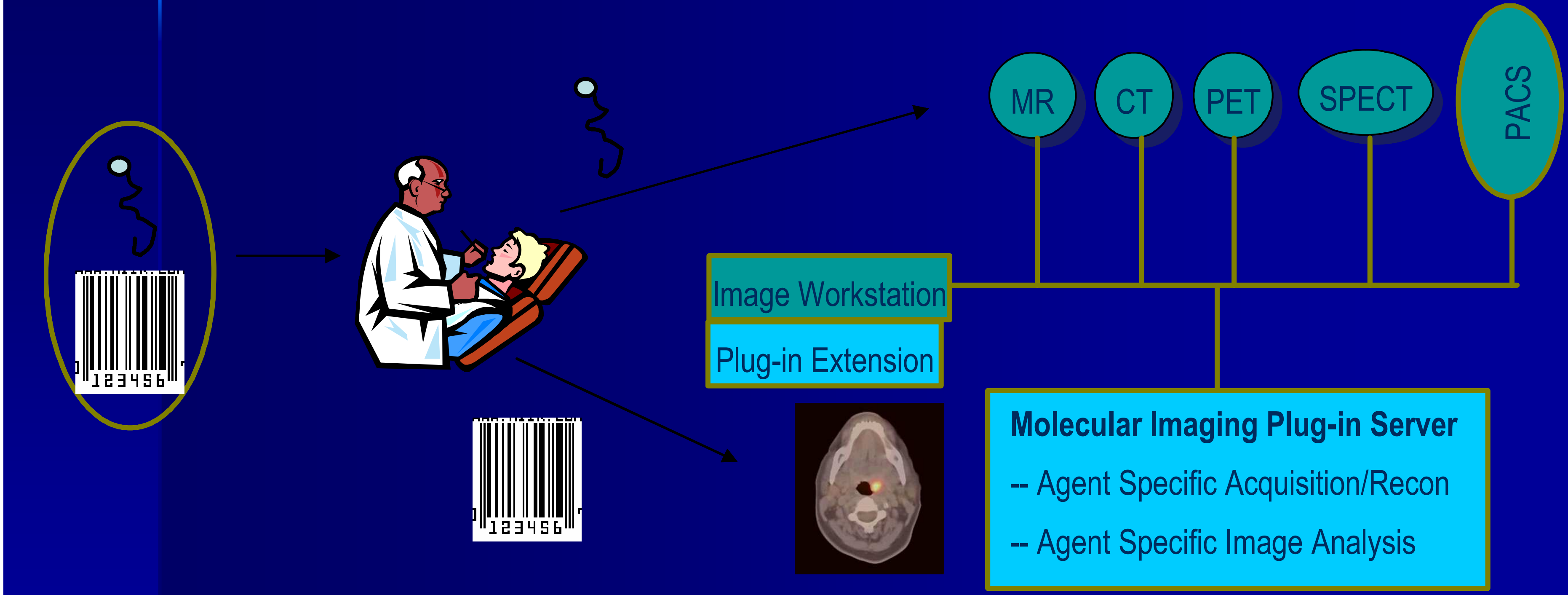


# Initial Driver – Molecular Imaging



- A ‘bright dot’ in the image is not sufficient
- Ideal is a quantitative number, with normal ranges derived from population, as now done in lab analysis
- Newer agents will require more sophisticated analysis:
  - Agent uptake/decay rates
  - Pre/post comparisons
  - Comparisons with surrounding tissue
  - Calibration
  - …
- Hundreds of new agents anticipated

# Potential Workflow



MR

CT

PET

SPECT

PACS

Image Workstation

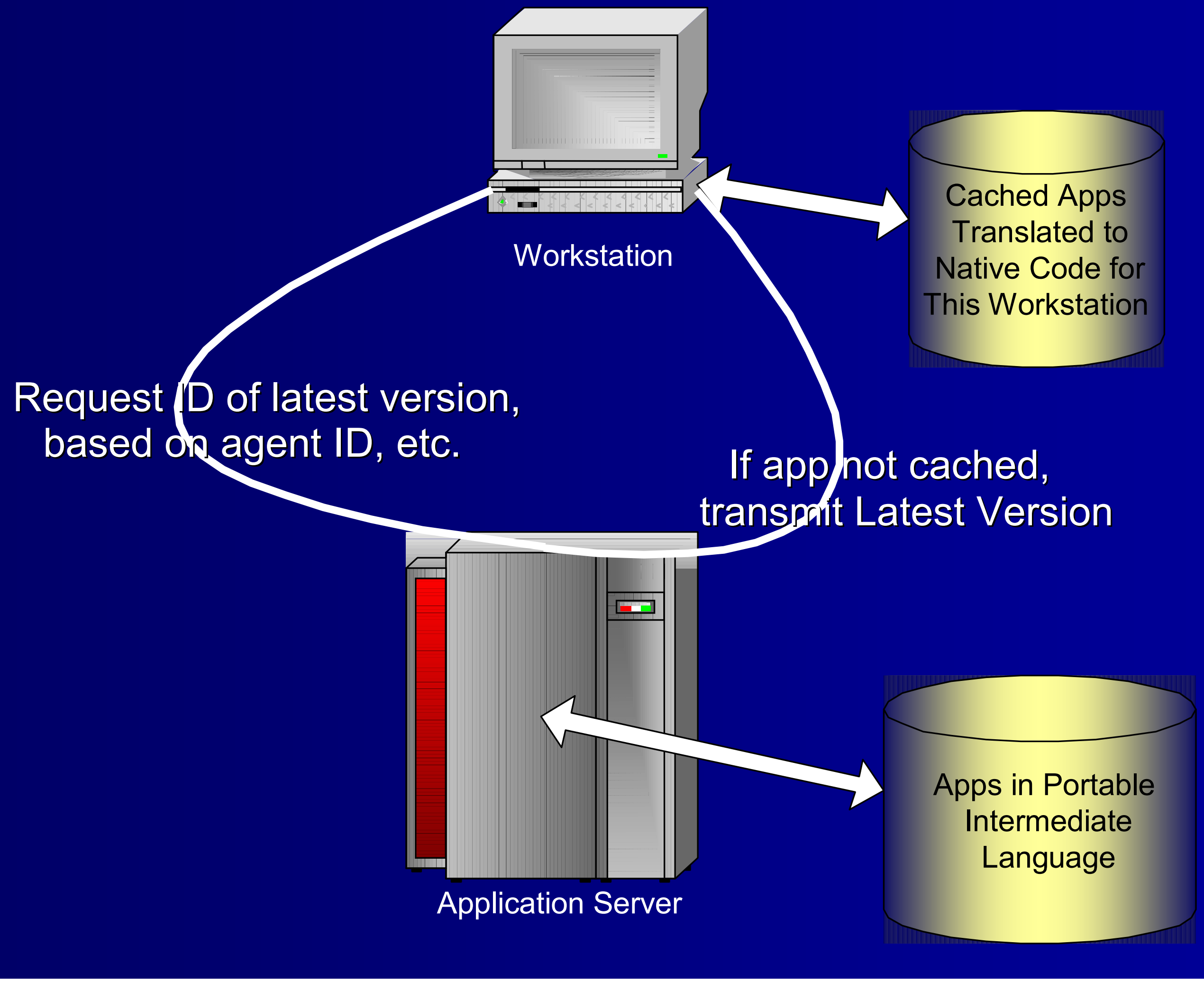
Plug-in Extension

**Molecular Imaging Plug-in Server**

-- Agent Specific Acquisition/Recon

-- Agent Specific Image Analysis

# Possible Deployment Strategy

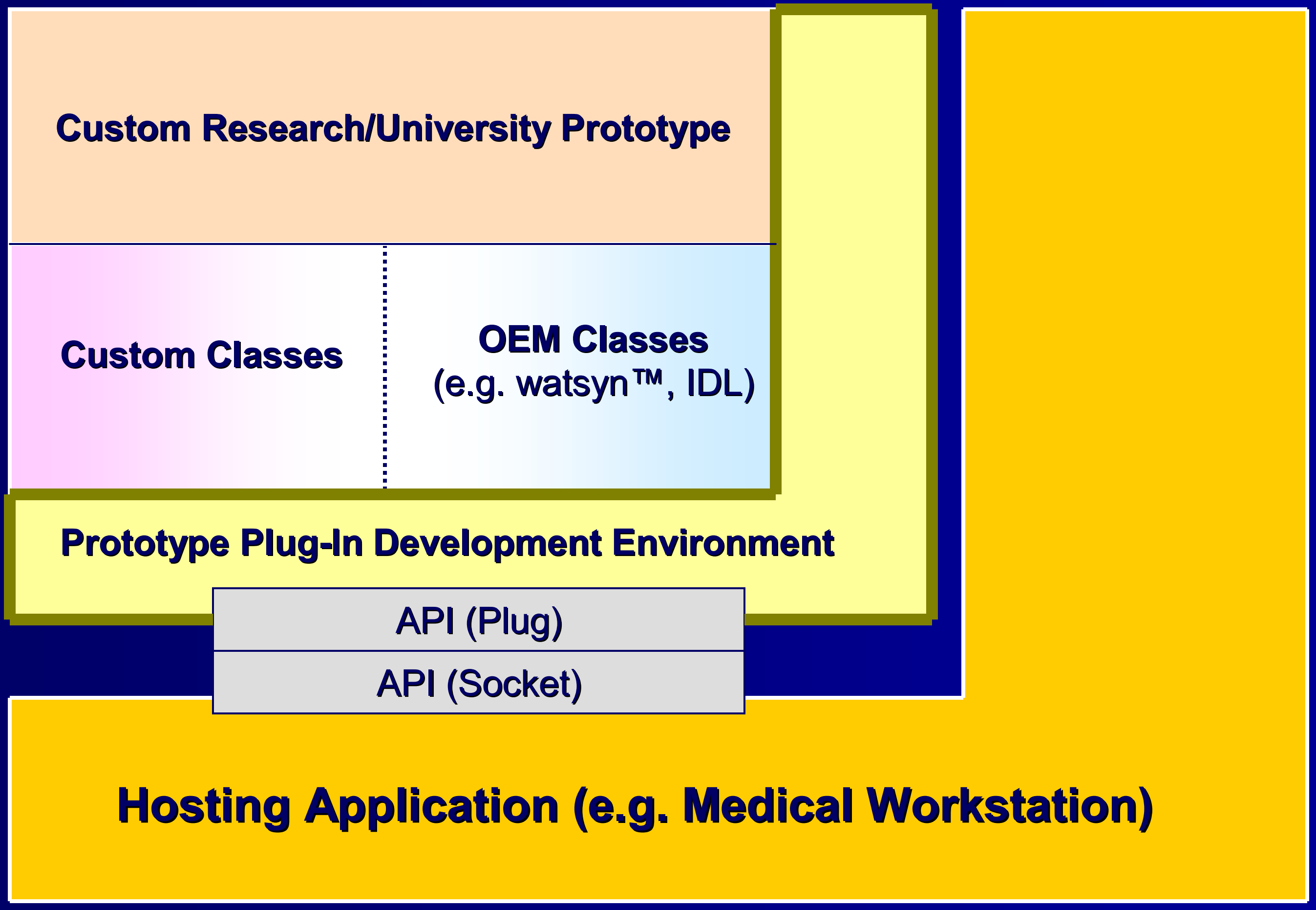


Workstation
Cached Apps Translated to Native Code for This Workstation
Request ID of latest version, based on agent ID, etc.
If app not cached, transmit Latest Version
Application Server
Apps in Portable Intermediate Language

# Other Use Cases

- SOP Class Specific Post Processing
- Screening Plug-Ins
- Customized Reporting and Display
- Print Composing
- Mammography Image Storage
- Analysis of Image Data in Repositories
- Multi-Site Collaborative Research

# Research Support



Custom Research/University Prototype

Custom Classes

OEM Classes
(e.g. watsyn™, IDL)

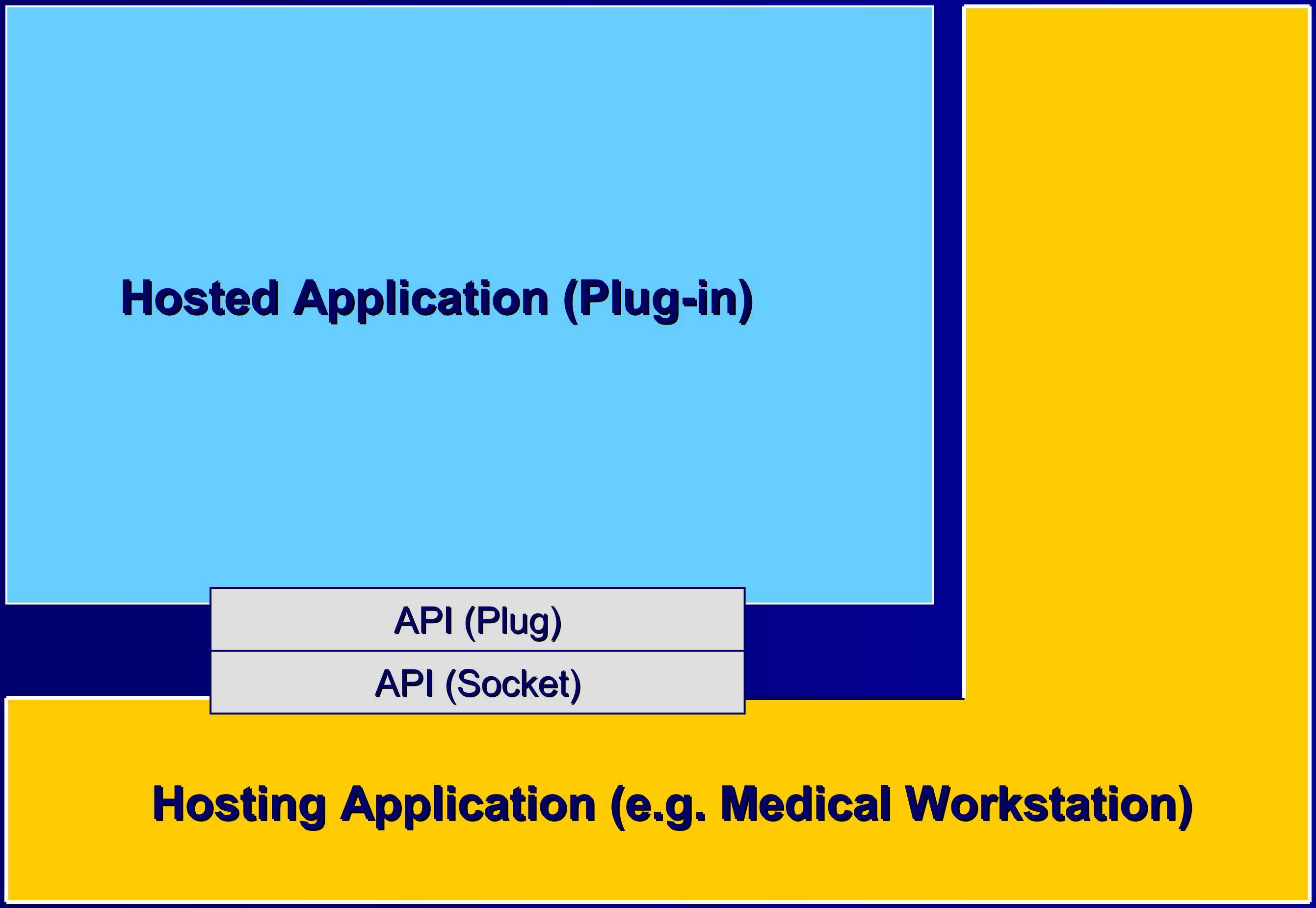
Prototype Plug-In Development Environment

API (Plug)

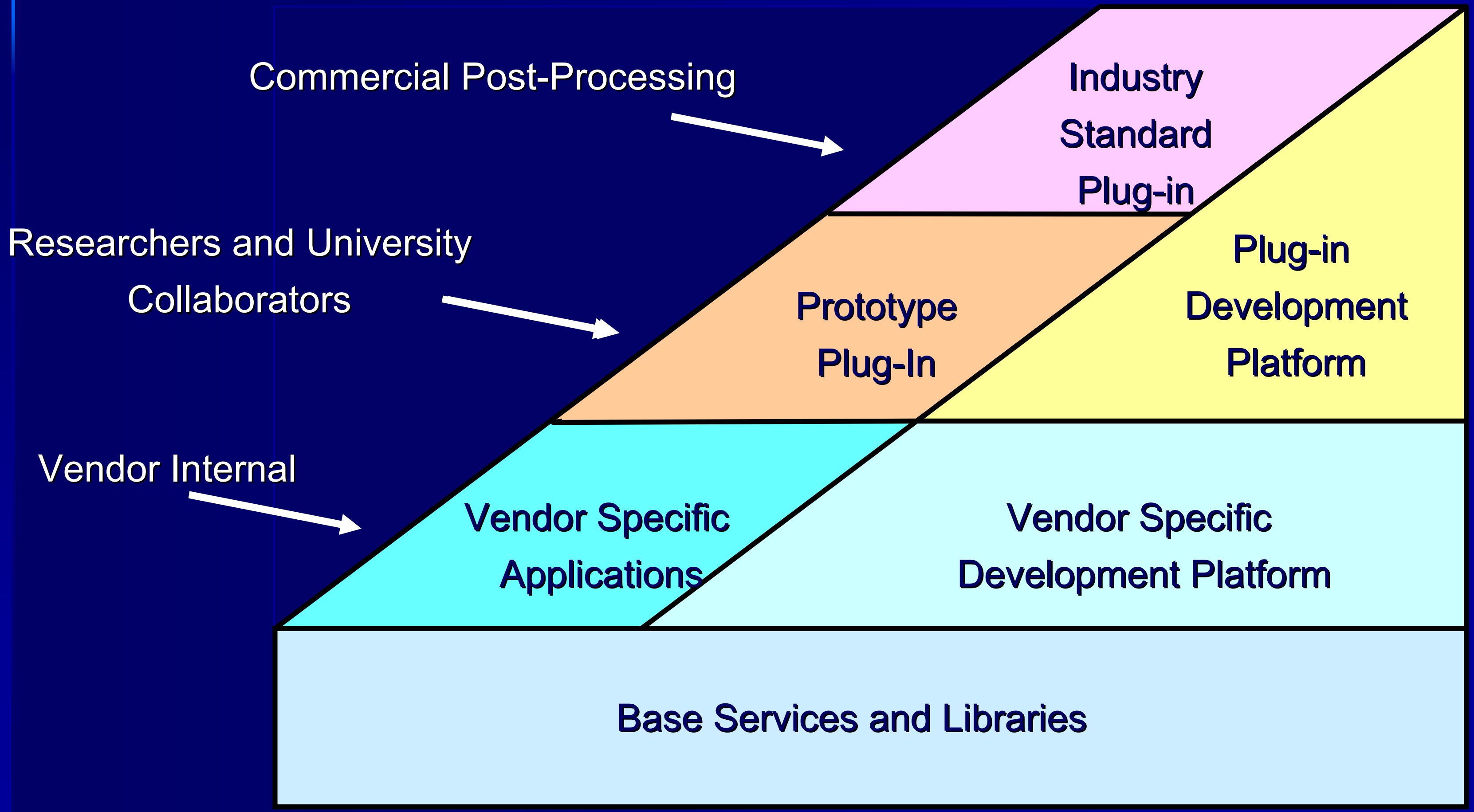
API (Socket)

Hosting Application (e.g. Medical Workstation)

# Commercialization


Hosted Application (Plug-in)
API (Plug)
API (Socket)
Hosting Application (e.g. Medical Workstation)

# Development Scenarios



Commercial Post-Processing
Researchers and University Collaborators
Vendor Internal
Industry Standard Plug-in
Prototype Plug-In
Plug-in Development Platform
Vendor Specific Applications
Vendor Specific Development Platform
Base Services and Libraries

# Suggested Staging

- Stage one – Access to DICOM Datasets and Results Recording
- Stage Two – Access to Non-Interactive Application Services (e.g. print, archive)
- Stage Three – Access to Interactive Application Services (e.g. GUI, ‘skins’, rendering)
- Stage Four – Standard Workflow Descriptions, and Interactions Between Hosted Software

# Work Cycle

1. Define Use Cases
2. Derive Requirements
3. Review available technology
4. Create draft for public comment
5. Freeze for trial use
6. Revise after feedback from implementers
7. Ballot

# Volunteers Solicited

WG 23 welcomes your input. We would be even happier with your assistance in creating this new standard.

- Join the mailing list
- Join us at future meetings (next is Nov. 7-8 in Arlington, VA)