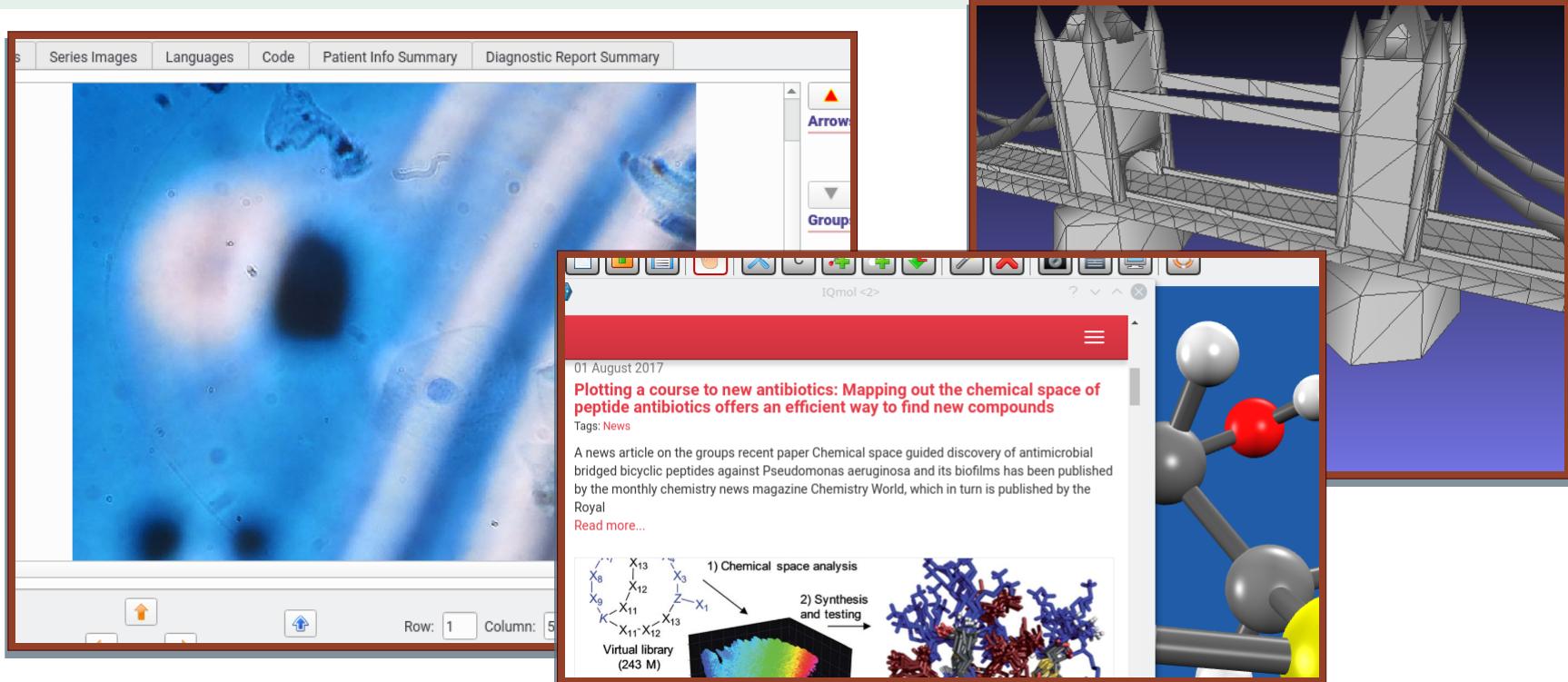


# The NCN/A3R ("NA3")

## Native Application Development Framework



### Linguistic Technology Systems (LTS)

Amy Neustein, Ph.D., Founder and CEO

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# Team Members

## Lead Software Architect

Nathaniel Christen, Doctoral Candidate, University of Ottawa. Specializations: C++, Programming Language Implementation, Cognitive and Computational Linguistics, Scientific Computing, Philosophy of Science, Digital Humanities.

## Quality Assurance and User Acceptance Consultant

Ara Mehetarian, former head of Quality Assurance at Random House and AIG.

## Medical Imaging and Data Communications Consultant

Alan H. Rowberg, M.D., formerly RIS/PACS Manager at Northwest Hospital; Co-Developer of DICOM protocol formerly Co-Chair of DICOM Standards Committee.

## Company Founder and CEO

Amy Neustein, Ph.D., Editor-in-Chief of the *International Journal of Speech Technology*; Editor of De Gruyter Series in Text Mining in Medicine and Health Care; Editor of SpringerBriefs in Speech Technology; Author/Editor of 12 academic books on natural language processing, speech recognition, text mining, speech and automata, forensic speaker recognition, mobile speech, and cyber-physical systems and smart homes.

# Capital Raising for Round A, ROI, and Exit Plan

- ◆ New Jersey-based home-grown female-headed software development company launching “Round A” between \$1.5 and \$2 million .
- ◆ Conservative burn with 5 year exit plan.
- ◆ Company valuation at \$100 Million at exit. <sup>1</sup>
- ◆ Business model: customization, hosting, and licensing. <sup>2</sup>

---

<sup>1</sup> See Slide 10 for development stages and exit strategy.

<sup>2</sup> See Slides 8 and 11 for details.

# Our NCN (Native Cloud/Native) Protocol

NA3  
Team  
Capital  
NCN  
Qt  
Semantic Web  
Software Development Market  
Business Strategy  
NCN Revenue  
Comparability  
Development Phases  
Customization  
Potential NA3 Markets  
Examples

## Cloud/Native Components as Back-Ends for Native Software

- Our “Native Cloud/Native” protocol refers to native application front-ends paired with Cloud/Native (back-end) container instances.
- Code libraries and data representation may be shared across both endpoints.
- Common representation on both server- and client-side streamlines network communications (no need to marshal data between different formats).
- The NA3 technology can be ported to other application frameworks apart from Qt (wxWidgets, XCode, MFC, etc.).
  - Note: This presentation will focus on NA3’s default Qt implementation.

## How Cloud Back-Ends Enhance Native Front Ends

- Cloud Backup     ● Share Data between Users     ● Collaborative Editing
- Maintain users’ application state across different computers (home/school/office)
- Upgrade running applications without needing to re-compile

# How NCN Addresses Limitations of Qt in the Cloud

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Qt is the most popular native, cross-platform application-development framework.

- ◆ ~1 million active developers ◆ Over 5,000 client companies ◆ Worldwide “Qt Partners” Ecosystem ◆ ~US \$25 billion overall market

## However, There is Limited Qt Cloud Integration Support

- “Qt Cloud Services” Discontinued in 2016.
- Currently there is no standard model for accessing Cloud services from Qt applications.
- Nor is there a standard Qt-based Cloud/Native container architecture.

# How NCN Addresses Limitations of the Semantic Web

NA3  
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Capital  
NCN  
Qt  
Semantic W  
Software  
Development  
Market  
Business  
Strategy  
NCN Revenue  
Comparability  
Development  
Phases  
Customization  
Potential NA3  
Markets  
Examples

Many experts have critiqued the Semantic Web for lacking conceptual rigor, adequate modeling for multi-scale information, and intrinsic representations for Quality Assurance Requirements. To address these limitations, NCN introduces new Semantic Web technologies with the following features:

## The Application-as-a-Resource (A3R) Application Model

- A3R Applications are self-contained, citable resources which can conform to modern resource documentation standards, such as the Research Object protocol.
- A3R includes a representation for natural language publications (e.g., books and articles) that unifies different manuscript formats (such as XML, L<sup>A</sup>T<sub>E</sub>X, and XCONCUR).

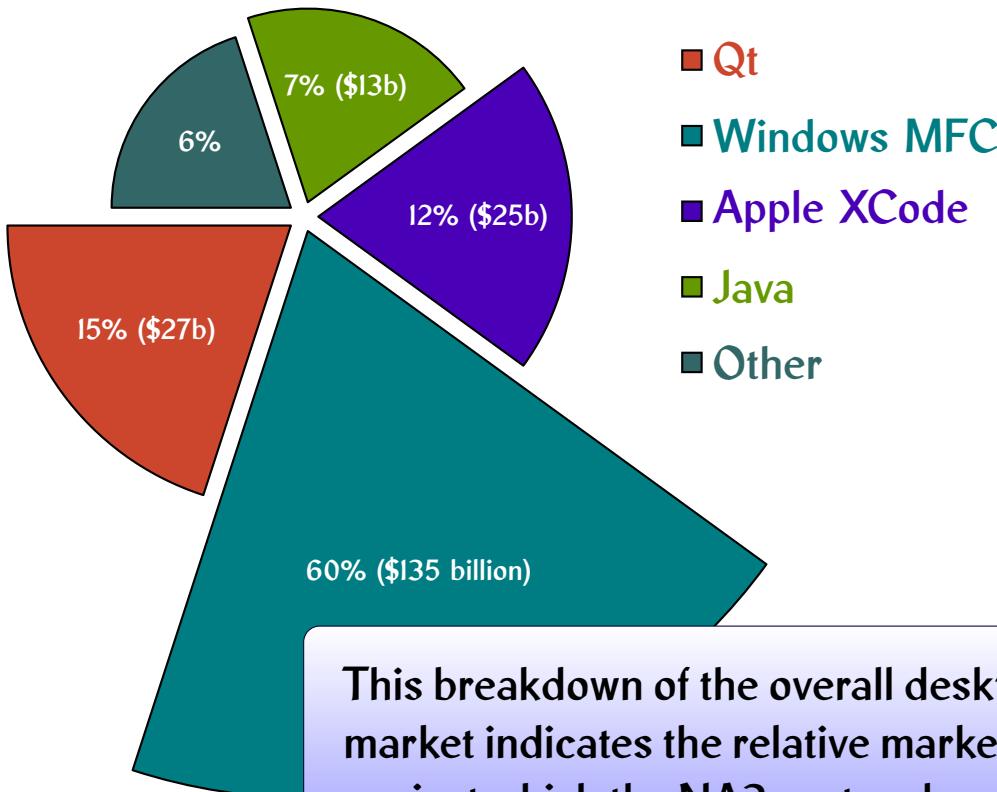
## Multiscale, Requirements-Focused Resource Description

- NA3 incorporates Semantic Web alternatives with greater Requirements Engineering and Quality Assurance precision, such as Conceptual Space Markup Language.
- Hypergraph-based Resource Framework to intrinsically support multi-scale data structures.
- Workflow-oriented “Meta-Procedure” Interface Definition framework to enforce procedural alignment among applications.

# Overview of the Software Development Market

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This slide offers a rough breakdown of the software development market, (estimated at \$350 Billion), restricted to desktop software (roughly one-half the total market), including both cross-platform and single-platform solutions.



This breakdown of the overall desktop application-development market indicates the relative market share of different platforms against which the NA3 protocols may be implemented.

Taking the Qt implementations of the NCN and A3R protocols as a prototype, analogous versions may be built targeting other popular software-development platforms (see next slide for a more detailed outline).

# Our NCN Business Strategy

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## Within the Qt Market

- Promote NCN as a standard solution for Qt/Cloud Integration.
- Promote A3R tools for building custom scripting languages for Qt.
- Promote the A3R protocol as a standard model for inter-application networking, describing applications, and serializing application-specific data structures.
- On the basis of these enhancements to the Qt ecosystem, LTS hopes to join the **Qt partners** program, which would expose NCN's unique features to a worldwide developer community.

## Outside of Qt (see slide 9)

- Generalize the NCN C++ reflection model and hypergraph libraries to standard (non-Qt) C++.
- Implement the A3R Protocols for standard C++ and for other languages (C#, Java, etc.).
- Implement language-agnostic hypergraph serialization to allow A3R networking between applications written for different operating systems and/or programming languages.

# NCN Revenue Sources

- ◆ **Customization** Custom-implemented applications using project-specific versions of NCN and/or A3R (see slide 11).
- ◆ **Licensing** Commercial licenses required for any deployment of NCN outside LTS-controlled servers and/or any commercial deployment of A3R applications.
- ◆ **Hosting** Running proprietary containers via a Cloud-Native service such as OpenShift, LTS can offer integrated hosting and consulting wherein LTS fully implements and maintains a back-end paired to any desktop/native client software. (Because the expertise involved in building native desktop applications is very different from the techniques required to deploy a Cloud-Native container image, the option of delegating all backend responsibilities to LTS may appeal to Qt-oriented development teams.)
- ◆ **Sponsorship** Running a data-sharing platform which would be a publicly-visible introduction to NCN. This “demo” container would host research data sets (and would therefore be a resource in the public interest) allowing LTS to receive compensation from companies financially supporting the portal because it is a technology which benefits science and research.

# Baselines For Projecting LTS Growth

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This slide considers sample Qt-based companies to establish a baseline for assessing the future growth of LTS.

- ◆ **The Qt Group Plc** *€45.6 Million annual revenue* (source: Qt) Financial records released by The Qt Group suggest that commercial “Developer” and “Distribution” licenses are Qt’s largest revenues source: Qt aims for 60% revenue from licenses, 20% from consulting, and 20% for “support and maintenance” — total net revenue across these sources was US \$57 Million.
- ◆ **ICS (Integrated Computer Solutions)** *US \$25-50 Million annual revenue* (source: Glassdoor) ICS specializes in custom software development for companies in the military, aeronautics, and biomedical sectors. ICS exemplifies a Qt company whose revenue derives mostly from customization and consultation.
- ◆ **Toradex** *US \$16.2 Million annual revenue* (source: owler.com) Toradex specializes in microprocessors and embedded systems, one of the largest of several Qt partners focusing on embedded systems with Qt front-ends for touchscreens and/or desktop consoles.

# ROI and Development Phases

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Customization  
Potential NA3 Markets Examples

- I (9-12 mos) Establish a hosting platform (projected to take the form of a RedHat Enterprise Service or Kamatera Partner affiliation) within which LTS can license individual cloud back-ends on a per-client basis, paired with clients' desktop front-ends. We will make tools available to help developers create applications that leverage NCN back-ends, including those hosted by our company.
- II (1-2 yrs) LTS will prioritize marketing its development libraries and cloud service, with an emphasis on explaining to Qt-based companies that the LTS hosting option provides functionality similar to the discontinued Qt Cloud Services.
- III (2-4 yrs) Generalize NA3 to standard C++ (eliminating Qt dependencies), implement NA3 in an Apple-specific version targeting XCode, port NA3 to Java, and build a Windows-specific implementation via MFC.
- IV (Fifth yr exit) With NA3 now realized in Qt, Windows, Mac, and Java versions, consolidate each of these implementations into canonical container prototypes, such as RedHat "Cartridges". This collection then becomes a comprehensive, multi-platform desktop/cloud integration technology valued at \$100M.

# Customization and Monetization

## ■ All development and licensing figures quoted are per-client

- ◆ **Custom NCN Servers** LTS builds special versions of NCN which natively recognize client's application-specific data types, preferred serialization formats, and client/server interface definitions.  
(dev: \$75K; licensing: \$10K/month)
- ◆ **Custom Markup and Scripting Languages** LTS builds scripting and/or markup languages customized for clients' unique data and interface requirements. These custom languages may be used for data serialization, testing, prototyping, and runtime fine-tuning of application behavior.  
(dev: \$250K; licensing: \$10K/month)
- ◆ **Custom GUI Components** LTS builds GUI classes on client's behalf, which natively support NCN integration. (dev: \$50K; licensing: \$5K/month)
- ◆ **Workflow Management** LTS customizes networking protocols so that multiple applications may be unified into distributed workflows.  
(dev: \$50K; licensing: \$15K/month)

# NA3 In Different Software Ecosystems

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Examples

## Potential NA3 Markets (see Slide 6 for overview)

Windows MFC (~\$135b market size) A3R can be implemented in C++/CLI, building off of a generic-C++ version using the C++ Standard Library in place of Qt-specific data structures.

Apple XCode (~\$25b market size) Apple Operating Systems are based on Linux, so a Linux-oriented A3R implementation can form the basis of an XCode version. This XCode implementation would also be built around the C++ Standard Library.

JavaFX (~\$12.5b market size) The Java programming language provides the most widely used cross-platform application development framework outside of Qt. It is feasible to port C++ A3R implementations to Java. The core of this re-implementation would involve designing a Java Hypergraph Library compatible with the A3R serialization and Interface Definition protocol.

Workflow Management (~\$10b market size – source: MarketsandMarkets) A3R plugins can be added to new or existing applications to support inter-application networking, unifying multiple applications into workflow-management systems.

# Example Use-Cases

## Inter-Application Networking and Workflow Management

- Export data and instructions between Qt-based applications (slides 15-16).
- Embed document or multi-media viewers inside scientific or dataset applications (slides 27-30).

## Responsive desktop-style applications for enhanced UX

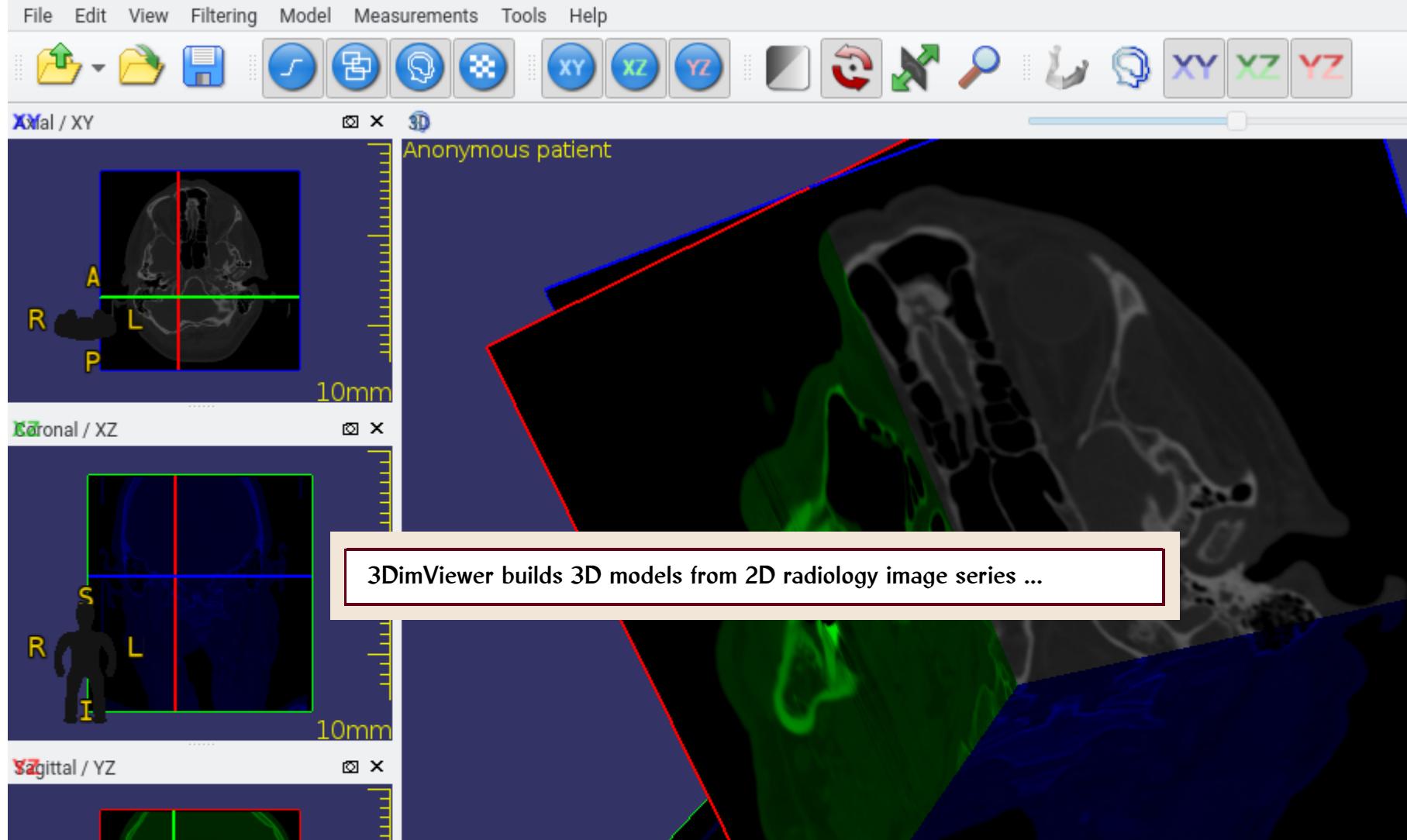
*Native applications offer superior User Experience, leveraging distinct interactive features of desktop GUIs: context menus, dialog boxes, tool tips, Multiple Window Display, dock windows, and so on:*

- Compelling front-ends for e-commerce (Note: “46% of global online retail orders happen on desktop”, source: leftronic.com), Real Estate, VR, etc. (slides 20-26).
- For scientists and researchers, build innovative data-collection instruments as well as interactive Research Object applications (slides 17-19).

# An Example of Inter-Application Networking

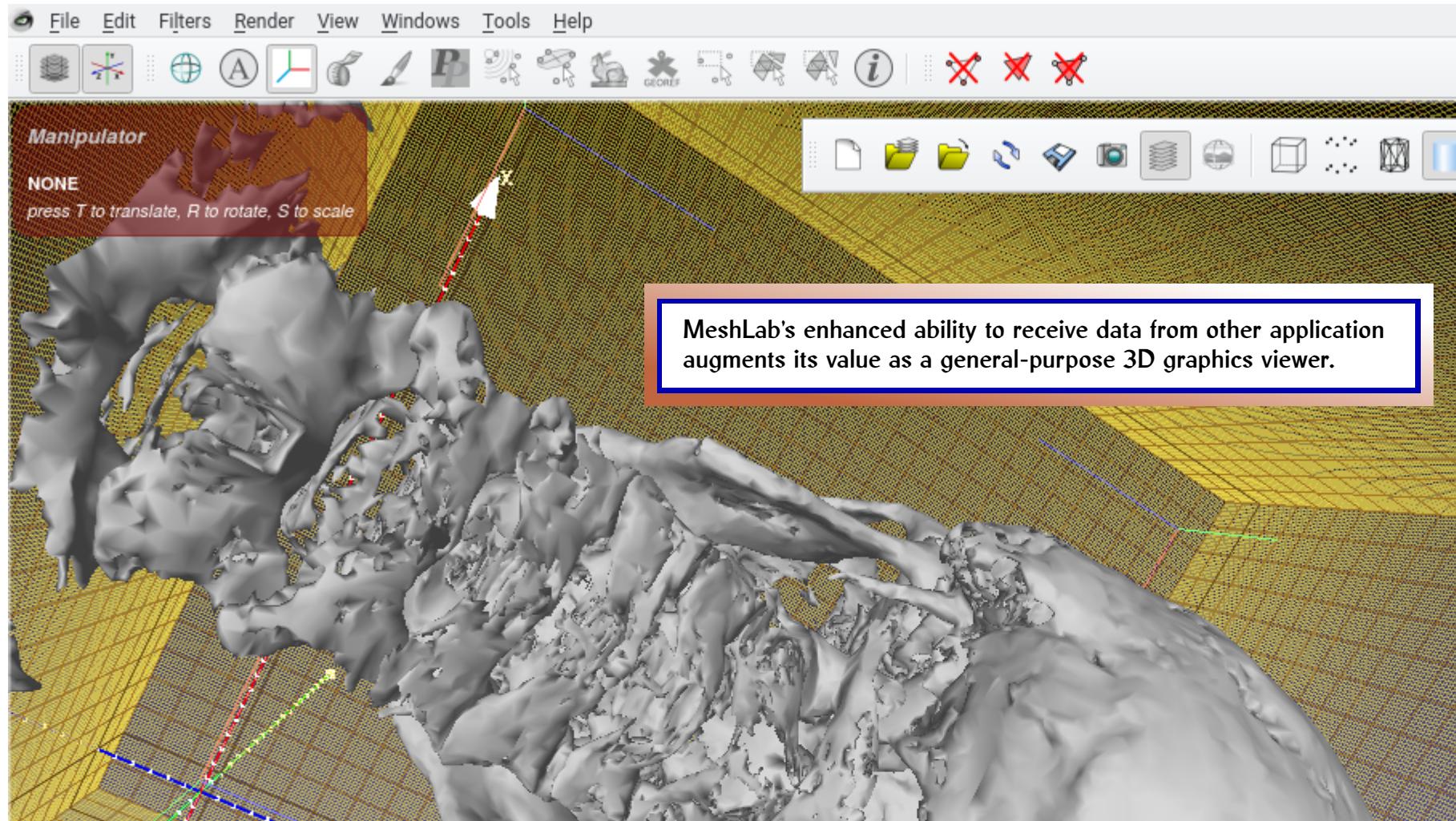
Research S  
Research Slide 2  
Research Slide 3  
Research Slide 4  
Research Slide 5

This slide and the next demonstrate a case-study where inter-application data sharing enhances the capabilities of two applications: 3DimViewer (a radiology tool) and MeshLab (a 3D graphics engine).



# 3D Graphics Sent to MeshLab

... Once the 3D tissue sample is constructed by 3DimViewer's algorithms, an A3R inter-application networking protocol (implemented as an extension to both applications) allows 3DimViewer to export the model to MeshLab so that it may be studied in a more comprehensive 3D viewing environment.



MeshLab's enhanced ability to receive data from other application augments its value as a general-purpose 3D graphics viewer.

# A3R Applications as Data Collection Instruments

Research S  
Research Side 2  
Research S  
Research Side 4  
Research Side 5

Forms Web Language Help About

Save Form Open Form Cloud Save Cloud Open Submit Form

Page: 0 Search for: Forwards

Welcome Web

X ? ^ × Form Outline

Click on a subheading to continue

Patient Information  
Chief Complaint  
Review of Symptoms  
Treatment History  
Medical History  
Current Medications  
Family History

ndp-main-outline <5> ? ^ ×

Referring Doctor: Dr. New Test

Referred By (Choose One): Clinical Specialist

Date of Visit: 1/9/16

Please List your Previous Stays

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| 31  | 1   |     |     |     |     |     |
| 7   | 8   |     |     |     |     | 6   |
| 14  | 15  |     |     |     |     | 13  |
| 21  | 22  |     |     |     |     | 20  |
| 28  | 29  |     |     |     |     | 27  |
| 4   | 5   |     |     |     |     | 3   |

OK Print

January 2018

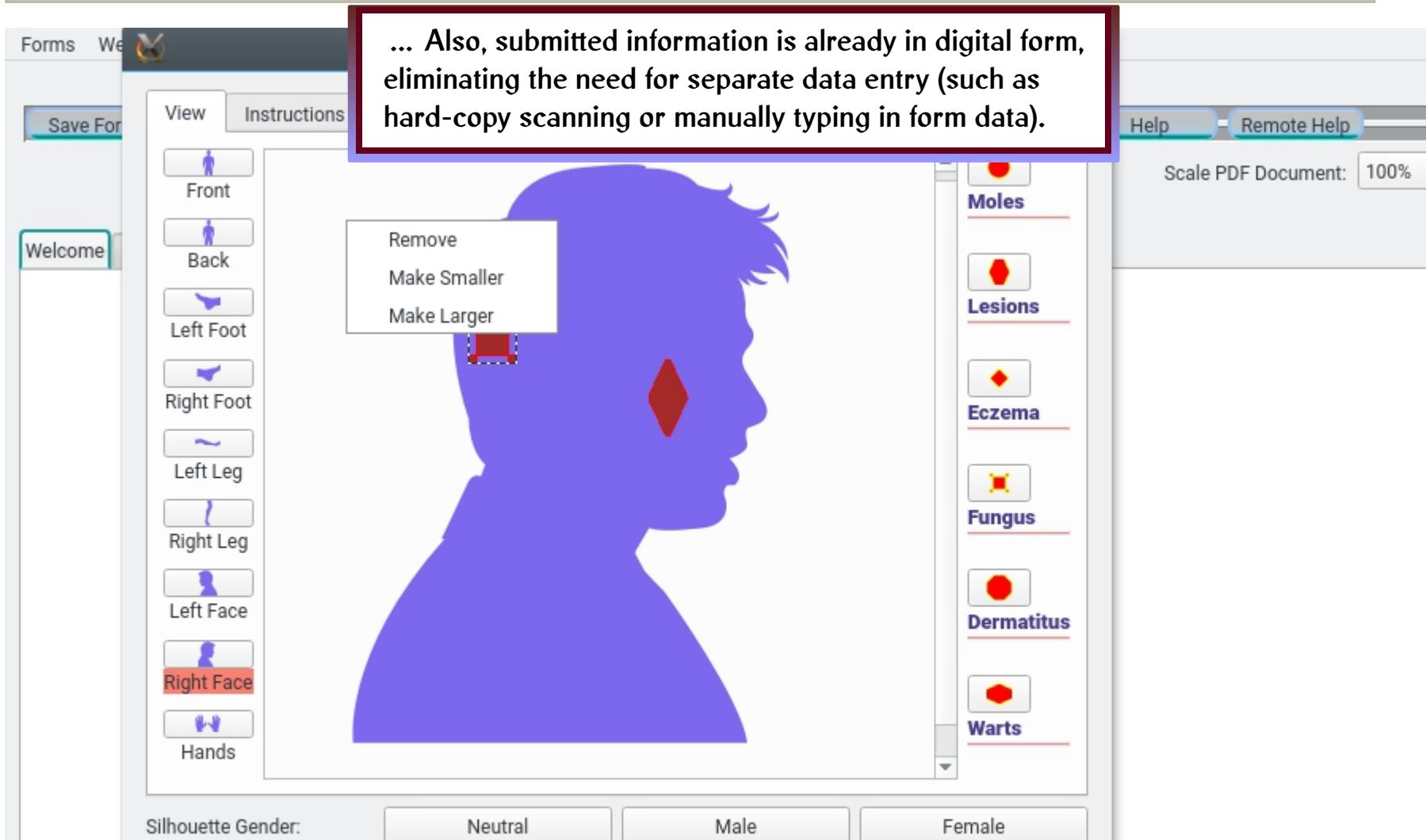
February 6  
March 13  
April 20  
May 27  
June 3  
July 10  
August  
September  
October

In medicine and social science, “data collection instruments” (DCIs) refer to surveys, questionnaires, and other tools to obtain human feedback.

# Qt-Based Interactive Forms

Research S  
Research Side 2  
Research Slide 3  
Research S  
Research Side 5

Data Collection Instruments implemented as native desktop applications can have easily navigable, interactive forms that make it simpler for people to provide information ...



# A3R Applications as Research Objects

Complementary to A3R components which facilitate *obtaining* research or experimental data, A3R “Data-Set Applications” are also powerful tools for visualizing and analyzing research findings.

Data-Set Applications are “Research Object Bundles” — combinations of code and data, providing access to data sets without the need for external software dependencies.

The interface shows a central image of a cell with a red arrow pointing to its nucleus. To the left is a vertical stack of small thumbnail images. To the right are toolbars for annotations: Arrows, Comments, Lists, Arcs, and Rulers. At the bottom are controls for Silhouette Zoom, Image Transforms, Annotations Transforms, and movement buttons (Pan, Zoom, Slide, Pan, Rotate, Zoom).

# Native Applications as Interactive Catalogs

E-Commerce  
Slide 1

E-Commerce  
Slide 2

E-Commerce  
Slide 3

E-Commerce  
Slide 4

E-Commerce  
Slide 5

E-Commerce  
Slide 6

E-Commerce  
Slide 7

As a case-study in enhanced User Experience afforded by native applications, consider how static PDF catalogs and brochures can be turbo-charged into engaging, interactive software-based presentations.

The screenshot shows a user interface for a shoe catalog. In the center is a large image of two brown leather sneakers with white soles. A context menu is open over the right shoe, listing options: Detach Image, Detach Noteboook, Detach Description, **Detach Everything** (which is highlighted), Merge Windows, Explore Color Matches ..., View 3D Model ..., Take Screenshot, View Item List, and View Shopping Cart. To the left of the main image is a sidebar containing three smaller thumbnail images of shoes. At the bottom of the screen, there are navigation controls: a double arrow icon, a zoom slider labeled "Image Zoom:", and a numeric input field set to "Item: 3". Below these controls is a horizontal ellipsis (...). At the very bottom of the interface, there are tabs for "Overview", "Features", "Specs", and "Reviews". Under the "Overview" tab, there is a bulleted list: • Leather upper, • Lace-up, • Round toe. On the right side of the interface, there is a section titled "Grand Crosscourt II Sneaker" with the following text: "Sleek and simple, the Grand Crosscourt II sneaker from Cole Haan is the perfect way to add some tailored casual style to your every day look!". Below this text is a heading "Actions:" followed by a bulleted list: • [Add to Cart](#), • [Explore Colors](#). There are also two small circular icons, one orange and one black, below the actions. The overall layout is clean and modern, designed for a mobile or tablet device.

# Interactive Shopping Carts

Instead of static lists, shopping carts can be made into multi-dimensional, multiple-window interactive displays.

The screenshot illustrates a multi-dimensional shopping cart interface. At the top, a navigation bar includes File, Email, Events, APIs, Web, and Broadleaf. Below it are search and filter controls: Page: 0, Search for:, and a zoom setting at 100%. A grid of thumbnail images shows various flower arrangements. Two main product windows are displayed side-by-side:

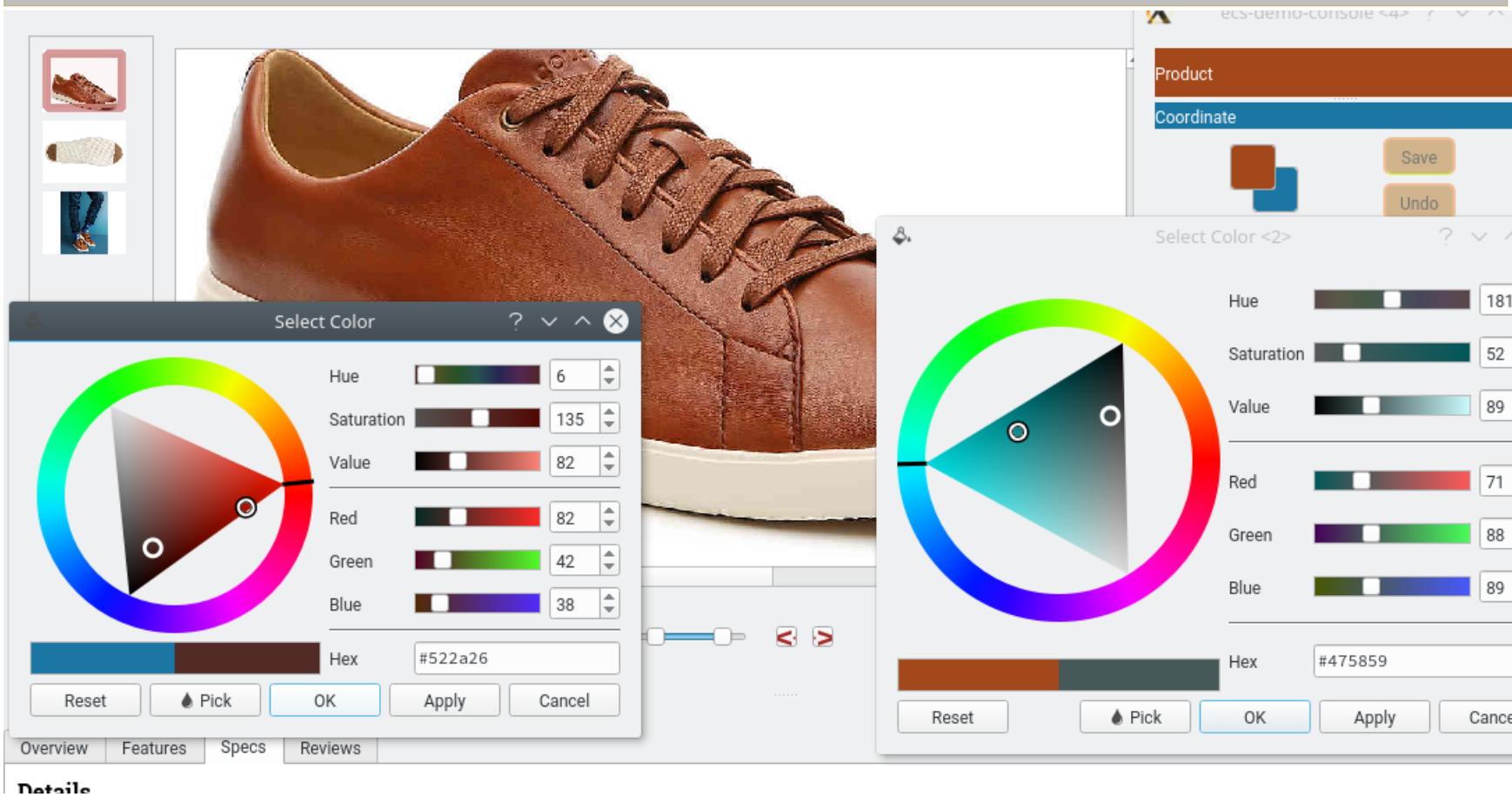
- Product Window <2>:** Features a purple peony bouquet. The left sidebar contains the product name: "Lily Garden Silk Peony Bouquet Home Decoration, Lilac, 18 Inches High". The right sidebar contains the product name: "Frosted Hydrangea, Mauve, 32 Inches High, 12 Floral Sprays".
- Product Window <3>:** Features a large hydrangea arrangement. The left sidebar contains the product name: "Lily Garden Silk Peony Bouquet Home Decoration, Lilac, 18 Inches High". The right sidebar contains the product name: "Frosted Hydrangea, Mauve, 32 Inches High, 12 Floral Sprays".

Each product window has tabs for Overview, Specs, Reviews, and Q & A, along with OK and Cancel buttons at the bottom.

# Explore Products with Native Software

E-Commerce  
Slide 1  
  
E-Commerce  
Slide 2  
  
E-Commerce  
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Slide 4  
  
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Slide 6  
  
E-Commerce  
Slide 7

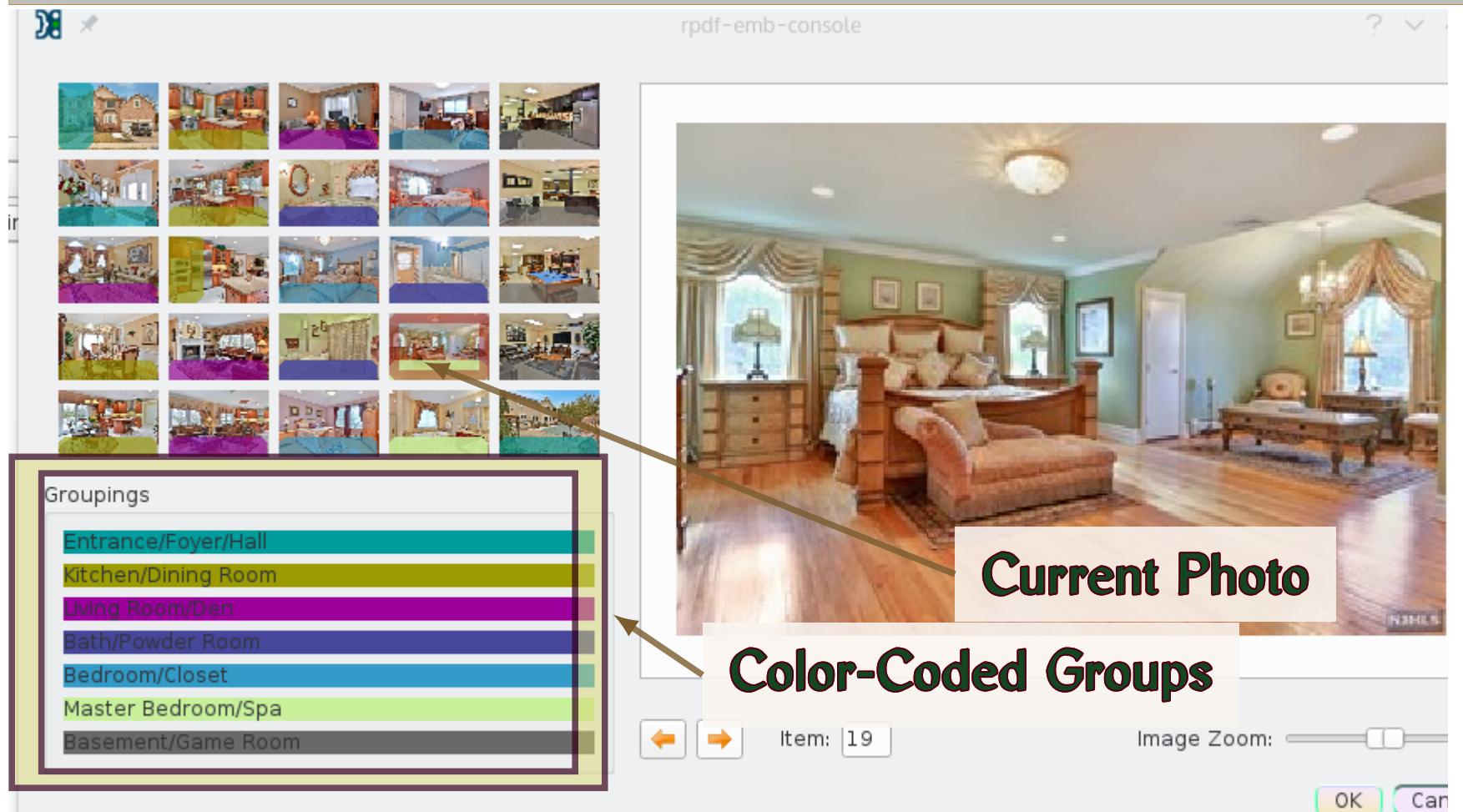
Interactive catalogs allow designers to incorporate many unique features and capabilities of desktop applications, such as using HSV color-wheel controls to explore color coordination while shopping.



# Interactive Real Estate

E-Commerce  
Slide 1  
  
E-Commerce  
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E-Commerce  
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A3R programming can also bring enhanced UX to Real Estate presentations: instead of just groups of photos, properties can be displayed via interactive, multi-dimensionally organized, color-coded photo viewers.



The screenshot shows a software interface for viewing real estate photographs. On the left, a grid of thumbnail images represents different property types and rooms. A specific thumbnail in the bottom row is highlighted with a red border and has an arrow pointing to a larger, detailed view of a bedroom on the right. The bedroom has green walls, a large wooden bed, and a chaise lounge. A white callout box with a dark border contains the text "Current Photo". On the far left, a vertical panel titled "Groupings" lists categories with corresponding colored bars: Entrance/Foyer/Hall (teal), Kitchen/Dining Room (yellow-green), Living Room/Den (purple), Bath/Powder Room (blue-gray), Bedroom/Closet (teal), Master Bedroom/Spa (light green), and Basement/Game Room (gray). The word "Groupings" is also present above the list. At the bottom of the interface, there are navigation arrows, the text "Item: 19", a zoom slider labeled "Image Zoom:", and buttons for "OK" and "Cancel".

Groupings

- Entrance/Foyer/Hall
- Kitchen/Dining Room
- Living Room/Den
- Bath/Powder Room
- Bedroom/Closet
- Master Bedroom/Spa
- Basement/Game Room

Current Photo

Color-Coded Groups

Item: 19

Image Zoom:

OK Cancel

# Photo Viewer Interactive Cues

These slides demonstrate visual cues aiding photo navigation, such as color bands (overlays) that switch from horizontal to vertical indicating which photos have been viewed so far; and the thumbnail of the current viewed photo marked with a thick colored border (surrounding the thumbnail photo and its overlays).

The screenshot shows a photo viewer interface with a grid of thumbnail images. A large, detailed photo of a living room is displayed on the right side of the screen. On the left, there is a sidebar with a list of 'Groupings' and a navigation bar at the bottom.

**Already Viewed (vertical color band)**: An arrow points to a thumbnail in the second row, third column, which has a thick vertical purple border around it.

**Not Yet Viewed (horizontal color band)**: An arrow points to a thumbnail in the fourth row, fifth column, which has a thick horizontal purple border around it.

**Current Photo (viewed for the second time)**: An arrow points to the thumbnail in the second row, first column, which has a thick purple border around it. This is also highlighted in the 'Groupings' list below.

**Groupings**

- Entrance/Foyer/Hall
- Kitchen/Dining Room
- Living Room/Den
- Bath/Powder Room
- Bedroom/Closet
- Master Bedroom/Spa
- Basement/Game Room

Navigation:

- Left Arrow
- Right Arrow
- Item: 10
- Image Zoom:

# Filtering Photos

Another feature which may be conveniently implemented in A3R-style photo viewers is a filtering option, which — given a collection of pictures classified into several groups — allows users to show or hide photos based on the group they belong to (note the check-box buttons on the group listing).

The screenshot shows a photo viewer interface with a sidebar of thumbnail images and a main view showing a living room. The sidebar includes a 'Groupings' section with several filter options.

**Visible Groups:** Entrance/Foyer/Hall (checked), Living Room/Den (checked), Bedroom/Closet (checked), Master Bedroom/Spa (checked). These are highlighted with a green oval.

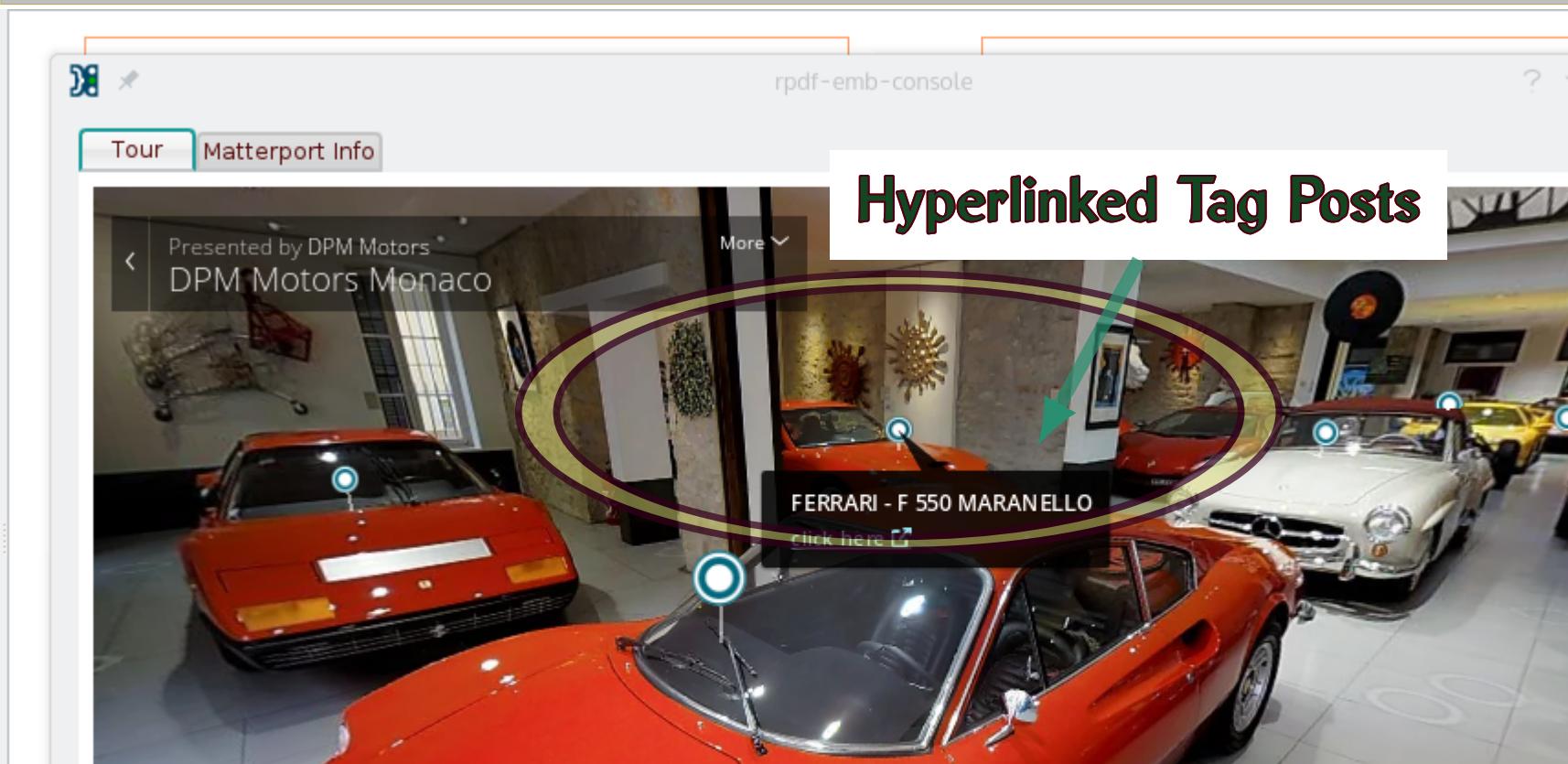
**Check Boxes:** Kitchen/Dining Room, Bath/Powder Room, Basement/Game Room. The 'Bath/Powder Room' checkbox has a red arrow pointing to it.

**Hidden Groups:** Basement/Game Room. This group is circled in red.

Below the sidebar, there are navigation arrows, an 'Item: 3' indicator, an 'Image Zoom:' slider, and 'OK' and 'Cancel' buttons.

# Interactive VR: Hyperlinked Tag Posts

Another emerging technology, relevant to both e-Commerce and Real Estate, is the use of Panoramic Photography to create immersive Virtual Reality scenes. Panorama-Photography-based VR engines, like Matterport, allow “tag posts” with embedded hyperlinks, which in a native-application context become channels of communication between the VR renderer and the host application. The full capabilities of this interactive modality — combining VR with clickable links and text “bubbles” — can only be fully realized via Virtual Reality engines (such as WebGL) embedded in native software.



# A3R Document Viewers

A3R applications may embed viewers for document formats such as e-Pub, HTML, and PDF; then supplement conventional publications with special components customized for individual manuscripts: e.g. (as in this case), a widget allowing readers to visually explore patterns in classical Indian music.

The screenshot shows a digital journal interface. At the top, there are three icons: a gear, a book, and a person reading. Below them are links for 'References', 'Library', and 'Reading'. A navigation bar includes 'HTML Source', 'Lisp', 'CSS', and 'XML'. A large red rectangular area covers the main content area. Below it, the text 'Read article view' is visible. At the bottom, there's a small icon of a person reading.

## ANTHROPOLOGY AND HUMANISM

[Explore this journal >](#)

### Ethnographer as Apprentice: Embodying omusical Knowledge in South India

da Weidman

Published: 26 December 2012 [Full publication history](#)

This screenshot shows a specialized A3R application window. At the top, it says 'Display Tala Types: Jhoomra/Dhamar (14 beats)'. Below is a visualization of musical patterns as colored rectangles (red, purple, green) arranged in a grid. A horizontal slider at the bottom is labeled 'Patterns' with 'Pattern 1 (3-4-3-4)' on the left and 'Pattern 2' on the right. Below the slider is a file path 'File /extension/ScignSeer/articles/svg/tala.svg'. On the right side of the window, there's a vertical scroll bar and a decorative graphic of a sun-like symbol.

Volume 37, Issue 2  
December 2012  
Pages 214-235



# A3R Document Viewers as Embedded Components

Publishing 1  
Publishing 2  
Publishing Slide 3  
Publishing Slide 4

Document Viewers may also be embedded in host applications which provide domain-specific visualization capabilities. For example, chemistry papers might be viewed within IQmol (a Qt-based program for molecular visualization and physical/chemical analysis) via an A3R document-viewer plugin.

The screenshot shows a chemistry application interface. At the top is a menu bar with options: Display, Build, Calculation, SONIC, and Help. Below the menu is a toolbar with various icons. On the left, there's a sidebar with a 'Springer' logo and a search bar showing 'Showing 157 results.' Below the search bar are filters for 'ENT' (157 results), 'CS', and 'Jemi' (37 results). A main content area displays a 3D ball-and-stick model of a cysteine molecule, featuring a central grey carbon atom bonded to two white hydrogen atoms and one red oxygen atom, which is further bonded to a yellow sulfur atom. To the left of the molecule, a context menu is open over the molecule, showing options like 'Configure', 'Select All', 'Reperceive Bonds', 'Duplicate Geometry', 'Atomic Charges', and 'Remove'. A 'SONIC' submenu is also visible. Overlaid on the bottom left is a search results window titled 'SONIC Reader'. It contains a 'Springer Keyword Search: Cysteine' tab, a 'Springer Web Search Home' link, and a 'Search Saved Articles' link. The search results window also shows the title 'Cysteine Proteases of Pathogenic Organisms' by Mark W. Robinson and John P. Dalton, published in 2011. At the bottom of the screen is a navigation bar with icons for back, forward, and search.

# Document Viewers Augmented With APIs

Publishing  
1  
Publishing Slide  
2  
Publishing  
3  
Publishing Slide  
4

Another strategy for interactive publications is linking documents with APIs maintained by publishers, or by cultural or educational institutions.

View Instructions

As an example, documents mentioning artifacts held in a museum can provide features to view more information about those museum-pieces through the host institution's API.



**MEDAL**

 Click the icon to save

This is a **Medal**. We acquired it in 1920. It is a part of the **Product Development** department.

Cite this object as

Medal; bronze; 1920-3

Row: 0 Column: 0

# Embedded Multimedia

Publishing  
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Custom-built A3R document viewers can provide convenient access to multimedia content embedded in or linked to texts — including audio files, videos, and 3D graphics scenes or models.

*Ailurus fulgens styani* (also known as *a. f. fulgens*): Only found in China (in the Hengduan

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In this case a video player is launched in a dialog box, floating above the article text. For those reading digital books or articles, videos and other multimedia content can be presented through secondary windows launched via context menus; text and multimedia may thereby be viewed side-by-side.

## Behavior

Red pandas are generally solitary, but there are a couple of cases where they develop extended associations with their mothers that last throughout the breeding season.



In terms of territoriality, red pandas tend to have overlapping home ranges with other. This means that they do not search for their own food, but instead patchily distributed across the landscape.

[arkive.org/red\\_panda/about-the-red-panda/](http://arkive.org/red_panda/about-the-red-panda/)

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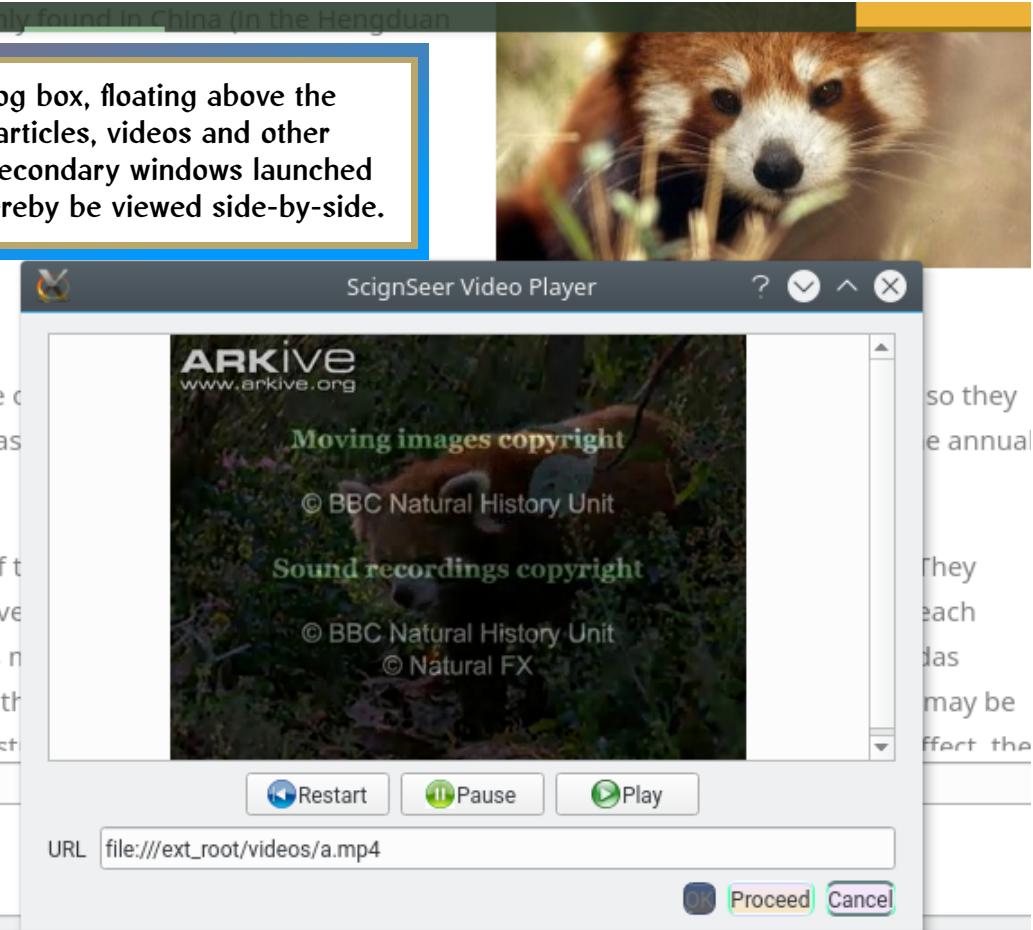
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