

Displaying Color-managed images on arbitrary mobile or static displays

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Markets that need this technology

- Professional photography
- Image conservation (Museum) and presentation
- Image Rendering
- Graphic Arts remote proofing
- Digital Signage



Why is it needed?

- Potential for huge number of color critical images in the cloud.
- Wide range of remote display technologies for mobile and static use
- Displays are connected to a wide range of OS and hardware platform.
- Storage on mobile devices is limited and “sand boxed” by application



Typical Applications

- **Color Accurate Product Display**
 - Advertisement
 - Remote approval
- **Remote proofing of graphic printed content**
- **3d simulation (rendering) of virtual products**
- **Color Accurate display of Event and professional photography.**

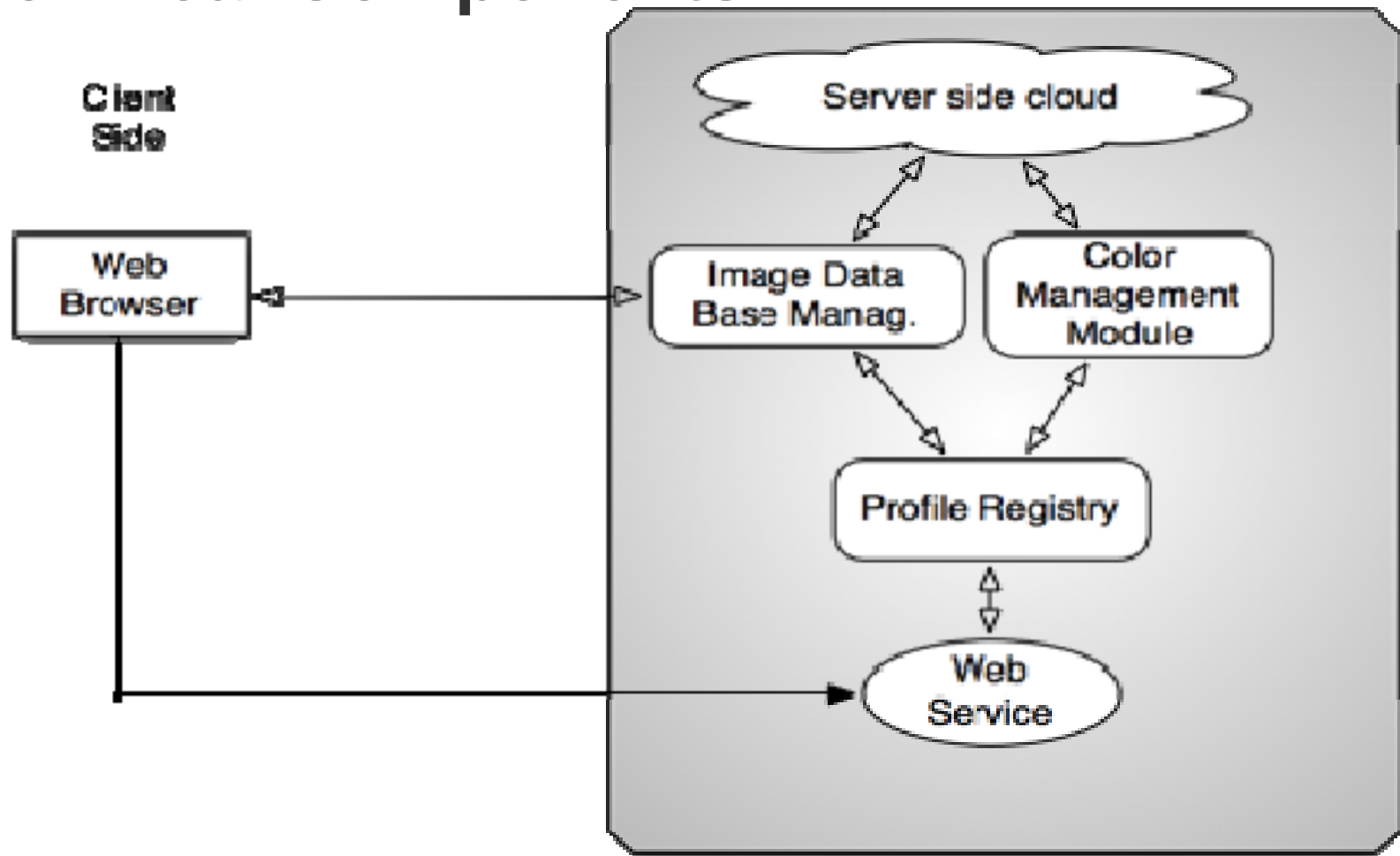


Why is color management so hard?

- **There are a large number of stakeholders**
 - Operating Systems
 - Application Programs
 - Profile Generation Programs
 - Measurement Hardware
 - Output Hardware
 - Lighting Hardware
 - Consumers / buyers
- **ICC Color Management has been historically focused on Image Reproduction with image color management at the platform level.**
- **ICC Color Management did not foresee the growth of electronic imaging both in capture and display.**

- **Inherently web or cloud based**
- **Remote communication is the norm, not the exception, as in desktop environments**
- **Processor, display, and storage capability very diverse across various product lines.**
- **Hardware interfaces are not uniform.**
 - Important note: Apple is changing the iPhone connector in the next generation.
 - Reliance on physical interfaces on mobile platforms is SUICIDE.
- **Changes in hardware and OS are coming at a blistering rate.**

Technical Components





Why hasn't color management been embraced on the web and mobile platforms?

- There is already a well established specification
 - W3C has stated all color must be sRGB
- Security:
 - Profiles allow for indiscriminant and undocumented binary data to be embedded into an image.
- Malformed profiles can crash an application:
 - Arbitrary profiles stored in an image can contain malicious code fragments
- Color management requires manipulation of every pixel.
 - Can be computationally expensive, thus impacting responsiveness in real time environments
- Late binding on the platform can lead to unanticipated outcomes
 - If color management occurs remotely, the originator loses complete control of the content.
- Color profiles take up valuable space on a mobile platform



Key points of solution

- Minimize software updates to mobile platforms
- Derive revenue and market information from participants in the mobile Eco-system
- Source color managed images without involvement of other infrastructure elements.



