Microsoft® Research

Faculty Summit 2010

Guarujá, Brasil | May 12 – 14 | In collaboration with FAPESP

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Transforming the Web Experience

Breakthrough Progressive Rendering Technologies for Fluid Visualization of Large Data Sets

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Reintroducing Live Labs

- Our Mission:
  - Advance the state-of-the-art of the Internet, creating transformative user experiences.
- You may already know our work:
  - Silverlight Deep Zoom, Photosynth, Thumbtack, Deepfish, …
- Everything we do starts with experiments:
  - Some experiments fail (*but we learn.*)
  - Some experiments succeed (*and make our products better.*)
- In addition to experiments, we ship code.

Seadragon

Inspire and enable
transformative user experiences
for retrieving and exploring content
regardless of location.

Seadragon

- Silverlight Deep Zoom
- Photosynth rendering engine
- Seadragon.com Azure service
- Seadragon Ajax
- DeepZoomTools library
- Bing Maps, Bing Mobile
- Silverlight Mobile
- Seadragon on Surface
- … and more to come.

Creating a Transformative User Experience

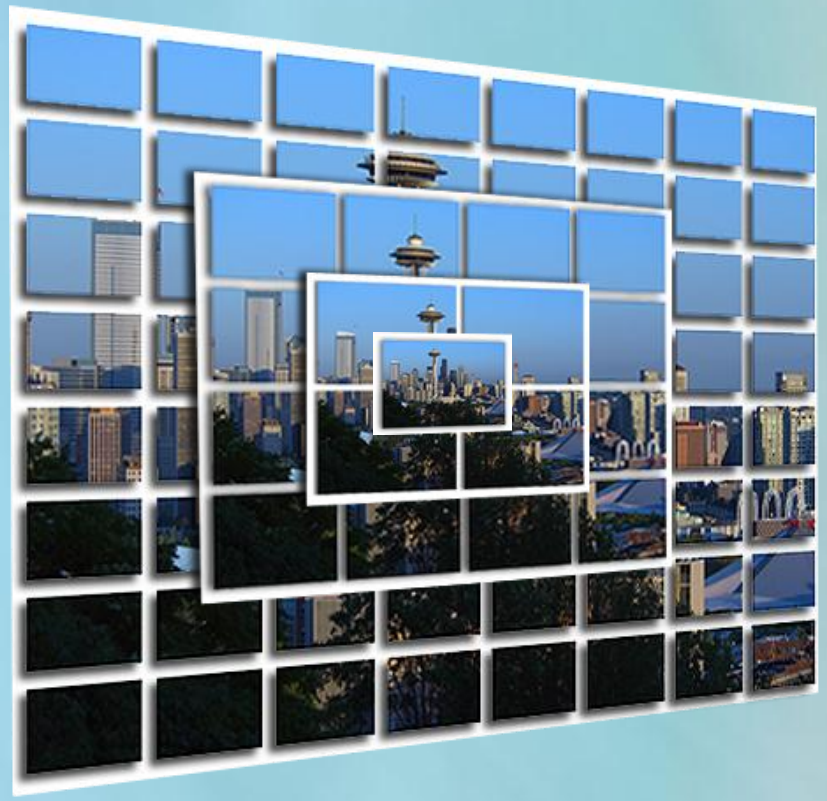
- The user never waits for the application.
- Retrieve only the content that's needed.
- Optimize for large data collections.
- Visual illusions to create a "magical" interface.
- Continuous zoom navigation to never get lost.
- Interact with the content, not the application.

The User Never Waits

Software should wait for users, not the other way around

- Retrieve content entirely off the main thread.
  - Use background worker threads.
  - Download asynchronously when possible.
- Decode images entirely off the main thread.
  - Use multiple threads whenever possible
- Throttle any required main thread work.
  - Texture creation, etc.
- Use all the system resources available.

Retrieve Only the Content That's Needed

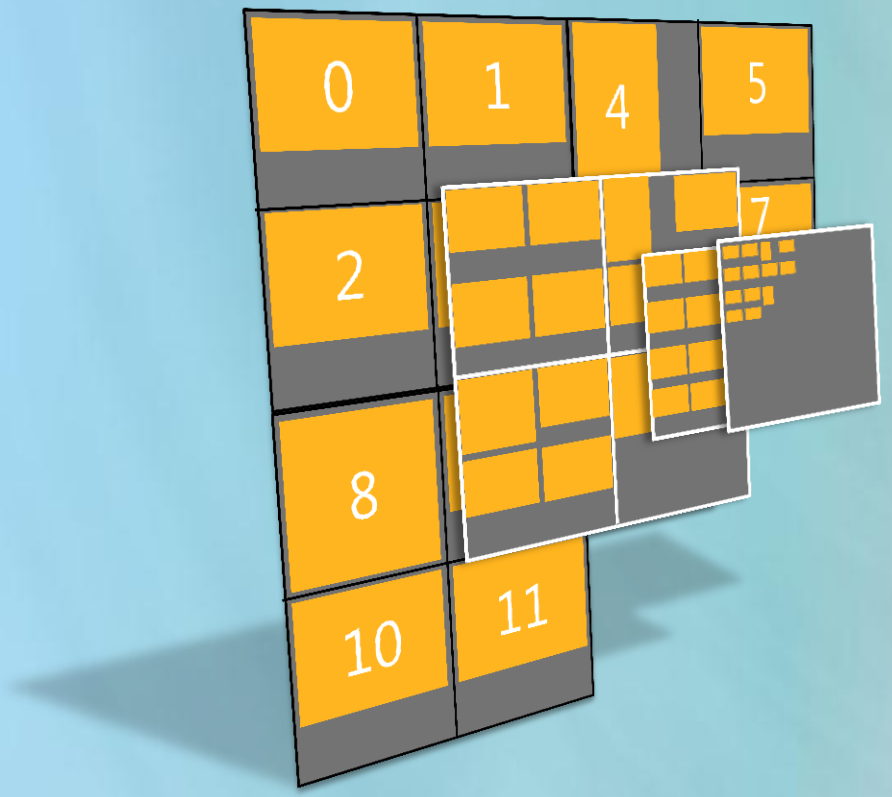


Deep Zoom Image (DZI)

Pyramid, levels, tiles, images

- Each tile is an image file
- Each level is a set of image files in a folder
- Each pyramid is a set of folders with image tiles for each level
- A simple XML file describes the size of the image
- Images can have only some tiles (sparse images)
- Pyramid is 1.4x original size
- 10Mpixels converts in 0.5s

Optimize for Large Content Collections



Deep Zoom Collections (DZC)
Pyramid, levels, tiles, files

- Thumbnails are packed into shared tiles
- Loading 100's of images requires loading few tiles
- Patented Morton layout makes adding items O(1)
- No more than one tile per level is not full
- Optimizes rendering by sharing textures
- Storage is roughly one thumbnail per image

Visual Illusions to Create a “Magical” Interface

Software should amaze & delight

- Introduce new content gradually.
- Animate with “springs”.
  - Accelerate and decelerate all animation moves.
- Update the center of the screen first.
- Blend across borders where quality differs.
- Anti-alias high contrast edges.
- Focus on performance.
- Don’t compromise the user experience.

Demo: ChronoZoom

- Dr. Walter Alvarez and Roland Saekow at UC Berkley
- Big History
  - Emerging field that attempts to unify the past, from Big Bang to present.
  - The four great historic regimes: Cosmos, Earth, Life, Humanity.
  - Brings together all kinds of scientific fields.
- ChronoZoom
  - 13.7 giga-annum time line (13.7×10^9 years)
  - Aids the comprehension of time relationships between events.
  - Intuitive visual approach to browse knowledge.
  - Tool for instructors, students and the general public.

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ChronoZoom

demo

A collaborative project between Microsoft Live Labs and
Dr. Walter Alvarez at UC Berkley

Demo: Microsoft Live Labs Pivot

- Latest experiment from Microsoft Live Labs.
- “The whole is greater than the sum of the parts.”
- Interact with thousands of items at once.
- Discover hidden patterns and insights.
- Collections combine large groups of similar items.

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Microsoft Live Labs Pivot

demo

Create Your Own Transformative Web Experience

- www.seadragon.com
  - Seadragon.com Azure service
  - Seadragon Ajax
  - Content creation tools
- www.microsoft.com/silverlight/deep-zoom
  - Overview, scenarios and how to
  - Developer information
- www.chronozoomtimescale.org
  - Introduction to Big History and ChronoZoom demo
- www.microsoft.com/silverlight/pivot
  - Download the Pivot client
  - Collection creation tools
  - Silverlight Pivot control (coming soon!)

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