Transforming the Web Experience
Breakthrough Progressive Rendering Technologies
for Fluid Visualization of Large Data Sets

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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.
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

- 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

Deep Zoom Collections (DZC)
Pyramid, levels, tiles, files
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 x 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.
ChronoZoom

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.
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!)