ESA JPIP Server

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J/Helioviewer Developers Meeting

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Outline

Introduction

- Existing JPIP server solutions:
  - Commercial: Kakadu JPIP server
  - Open-source: OpenJPIP and CADI
- None of the existing solutions fit all the requirements of the Helioviewer project:
  - Open-source license
  - Efficient transmission
  - Scalability and stability
- ESA promoted the development of a new JPIP server, in collaboration with the University of Almeria (Spain)

Development

- Authors:
  - J.P. García-Ortiz, J.J. Sánchez Hernández and V. González Ruiz (University of Almeria, Spain).
  - C. Martín (Robert Gordon University, UK).
  - D. Müller (ESTEC, Noordwijk, Netherlands).
- Code: C++ optimized for UNIX platforms.
- Repository:

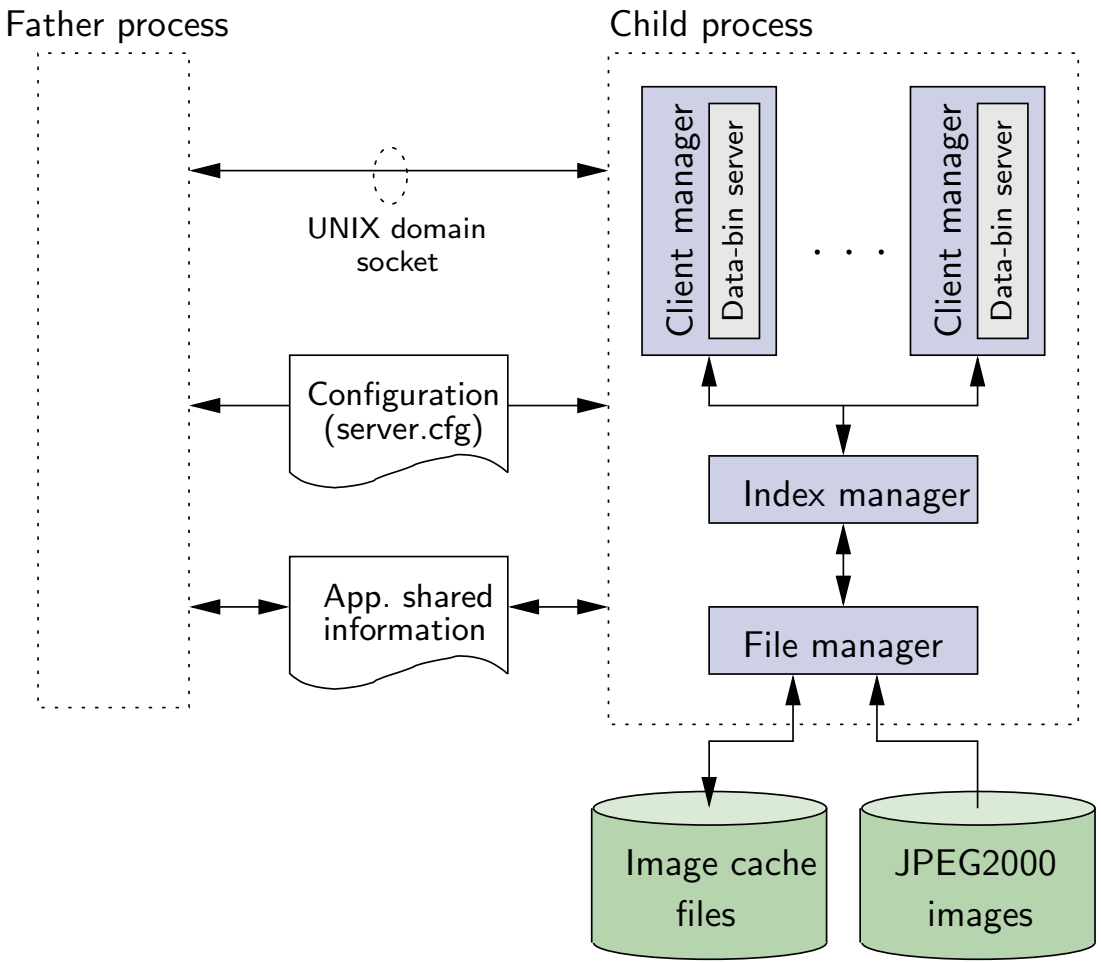
  `https://launchpad.net/esajpip`
- Debian package:

  `http://packages.qa.debian.org/e/esajpip.html`

  (Thanks Mathieu Malaterre!)

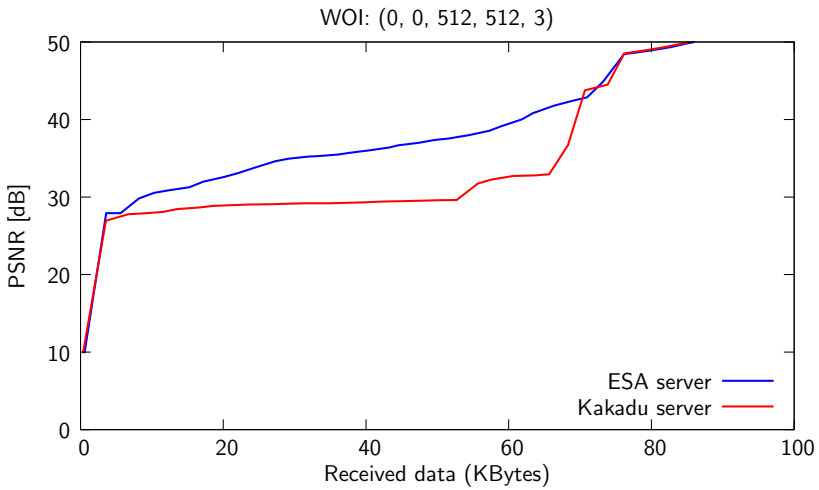
Architecture

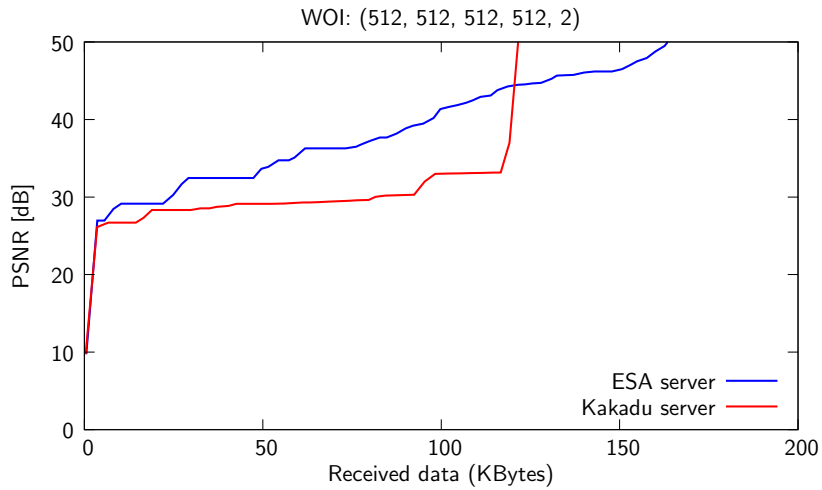
- Hybrid model combining **process** and **thread** approaches.
- Fault-tolerant and robust approach.



Performance

- Data transmission (PSNR vs. received data)





- Scalability (100 clients playing 1000-frames files)

	Memory (MB)		CPU (%)	
	Ave.	Dev.	Ave.	Dev.
ESA server	30.17	1.77	213.25	76.05
Kakadu server	1871.4	345.56	176.54	128.04

Distribution

Helioviewer project

Institut d'Astrophysique Spatiale (Orsay)

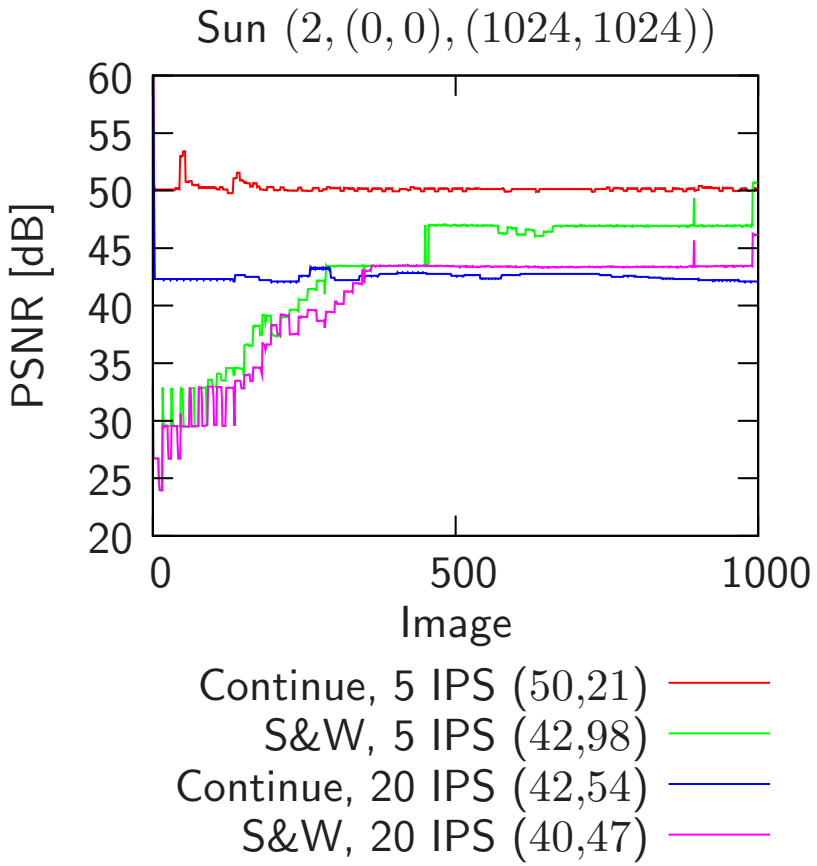
Belgian Royal Observatory

University of Almeria (Spain)

Any one else ?

Evolution

- Bug fixes
- General improvements
- Adaptive bitrate streaming



Related papers

- J.J. Sánchez-Hernández, J.P. García-Ortiz, V. González-Ruiz, and D. Müller. **Interactive Streaming of Sequences of High Resolution JPEG2000 Images**. Submitted to *IEEE Transactions on Multimedia* (2014).

- J.P. García-Ortiz, C. Martín, V. González-Ruiz, J.J. Sánchez-Hernández, I. García, and D Müeller. **Efficient and scalable open-source JPIP server for streaming of large volumes of image data**. In *IEEE International Conference on Consumer Electronics*, pages 380-384, September 2011. Berlin.

- J.J. Sánchez-Hernández, J.P. García-Ortiz, V. González-Ruiz, I. García, and D. Müller. **Transmission of low-motion JPEG2000 image sequences using client-driven conditional replenishment**. In Alejandro Linares Barranco and George Tsihrintzis, editors, *Proceedings of the International Conference on Signal Processing and Multimedia Applications (SIGMAP)*, pages 11-16, July 2011. Sevilla, Spain.

Related papers

- J.J. Sánchez-Hernández, J.P. García-Ortiz, C. Martín, Carmelo Maturana-Espinosa, V. González-Ruiz and D. Müller. **Improved JPIP-compatible architecture for video streaming of JPEG 2000 image sequences**. In Otoniel Mario López Granado et al., editor, *Proceedings of the II Workshop on Multimedia Data Coding and Transmission (WMDCT)*, pages 33-37, September 2012. Elche, Alicante, Spain.

- J.J. Sánchez-Hernández, J.P. García-Ortiz, Carmelo Maturana-Espinosa, V. González-Ruiz and D. Müller. **Streaming Interactivo de Secuencias de Imágenes JPEG2000 de Alta Resolución**. In Guillermo Botella y Alberto A. Del Barrio García, editor, *Actas de las XXIV Jornadas de Paralelismo*, pages 139-144, September 2013. Madrid, Spain.

- García Ortiz J.P., González Ruiz V., García I., Müller D. and G. Dimitoglou, (2010). **Interactive Browsing of Remote JPEG 2000 Image Sequences**. In *IEEE International Conference on Pattern Recognition*, pages 3179-3182, Istambul, Turkey. IEEE press.