Developing a Highly Automated Web Archiving System Based on IIPC Open Source Software

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outline

• 1 Introduction

• 2 Developing Web Archiving System
  – Web Archive Needs of NSL
  – Web Archiving System Framework
  – System Function Framework
  – Automated Workflow

• 3 Current Progress

• 4 Next Developing Plan
1. Introduction

- Preserving online science information has explicitly become a national strategy.

1. Introduction

- National Science Library (NSL), Chinese Academy of Sciences (CAS)
  - began a two-years pilot project with supporting by National Social Science foundation of China in 2006
  - Got another two-years funding from CAS to develop an operating system (NSL-WebArchive) for archiving the important web information in 2013.
Outline

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• 3 Current Progress

• 4 Next Developing Plan
2.1 Web Archive Needs of NSL

• Harvest periodically and sustainably
• Balance harvest frequency and speed so that it will not affect daily access of seed sites.
• Want more metadata and management
• Highly automated workflow to reduce manual work
• Support in-depth analysis of archived data
• Provide more services for users based on archived data

A high-performance system with less developing invest
2.2 Design Web Archiving Framework

• before developing web archiving system

  – An investigation of IIPC web archiving tools
    (The International Internet Preservation Consortium)
      • Heritrix, a highly-scalable crawler created by the Internet Archive.
      • Web Curator Tool & Netarchive Suite, Crawling management tool.
      • Wayback, an index and access tool based on URL.
      • NutchWAX, a full-text index tool.

  – Some research on other libraries’ work
    • French National Library
    • British Library
    • National Library of China
    • ……
2.2 Design Web Archiving Framework

- based on IIPC open source software

IIPC Web Archiving Framework

NSL Extension Framework Base on IIPC’s
2.3 System Function Framework

- **Central Controller (GATHOR)**
  - Seeds Management Report & Analysis
  - Task Queue Management Quality Control Management

- **Client Controller A**
  - Get task/Control Heritrix
  - File Transferring (WARC / Log)
  - Status Feedback
  - Heritrix A

- **Client Controller N**
  - Get task/Control Heritrix
  - File Transferring (WARC / Log)
  - Status Feedback
  - Heritrix N

- **Wayback URL index**
  - WARC Files
  - WARC Files
  - DB
  - Index

- **Wayback URL Retrieval**
  - CRetrival Full text Retrieval
  - CAnalyzer Visualization
  - API

**Collection Level**

**Storage Level**

**Access Level**
2.3 System Function Framework

• Collection Level (Central Controller-GATHOR)
  – **Seeds Management**: more described metadata (including type, subject, domain), administrative metadata and configure info.
  – **Crawling Task Queue Management**: automatically generate and schedule the crawling task, and monitor the status of each task.
  – **Report & Analysis**: analyze crawling log and provide analysis report
  – **QC Management**: check error for improving crawling effect
2.3 System Function Framework

• Collection Level (the Collecting Client)
  – Task Control Module: gets a task, controls Heritrix to crawl web and monitor its status.
  – File Transferring Module: transfer WARC files and crawling logs to the specified directory in the remote storage server.
  – Status Report Module: Report task status to GATHOR
2.3 System Function Framework

• Storage level
  – **WSOLR** with three sub-modules
    • **WARC Monitor**: automatically monitor the specified directory for the new uploaded file
    • **WARC Extractor**: extract related information from these files
    • **SOLR**: create incremental Solr index

• Access level
  – **CRetrival**: provide full text retrieval and facet navigation.
  – **CAnalyzer**: provide statistic and analysis function
2.4 Automated Workflow of NSL-WebArchive

- **Seed configuration**
- **Task Queue**
  - Get crawling task from the queue
  - Control Heritrix to crawl
  - Store crawling report to DB
- **Access Platform**
  - APIs
  - Increment fulltext index of WARC
  - Control Heritrix to crawl
  - Creating WARC file
  - Store crawling report to DB
  - Wayback URL retrieval
  - Increment index of URL
  - Storage directory (Local/remote server)
    - Automatically FTP transferring
  - Storage Server

Central Management Server
Collecting Client
2.4 Automated Workflow of NSL-WebArchive

**Three key parts** for highly automated workflow

- **GATHOR**
  - Task Queue Management Module: automatically generate and schedule the crawling task

- **Collecting Client**
  - Task control module, File transferring Module, Status Report Module: automatically get a task, control Heritrix and transfer files.

- **WSOLR**
  - WARC monitor, WARC extractor, SOLR: automatically monitor WARC files, extract data and create index
3. Current progress

Have finished the first stage work of system developing

• Enough metadata and more effective management

• A highly automated web archiving workflow

• More access services for users
  – URL retrieval, full text retrieval and facet navigation,
    Some statistical functions, Sites browsing
An integrated access platform

- Full text Retrieval
- URL Retrieval
- Site describing info
- Statistical data
- sites browsing by subject
Full text retrieval and facet navigation

different versions retrieval for the Same Page
Some statistical analysis

站点名称：欧盟生物燃料技术平台
站点地址：http://www.biofuelstc.eu/
学科领域：能源

存档记录：

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存档时间-URL数分布图

存档种类分布图
4. Next developing plan

- How to gain maximum value from archived resources
  - Support in-depth data mining
  - Provide functions for effective assessment of S&T policy and technology decisions, strategic decisions, trends analysis of domain, and predict future trends, etc.

These needs will become the main target of our next developing plan
Thanks

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