

Work Ahead

Alberto Accomazzi and the ADS Team

ADS Users Group Meeting, 20-21 Nov. 2019

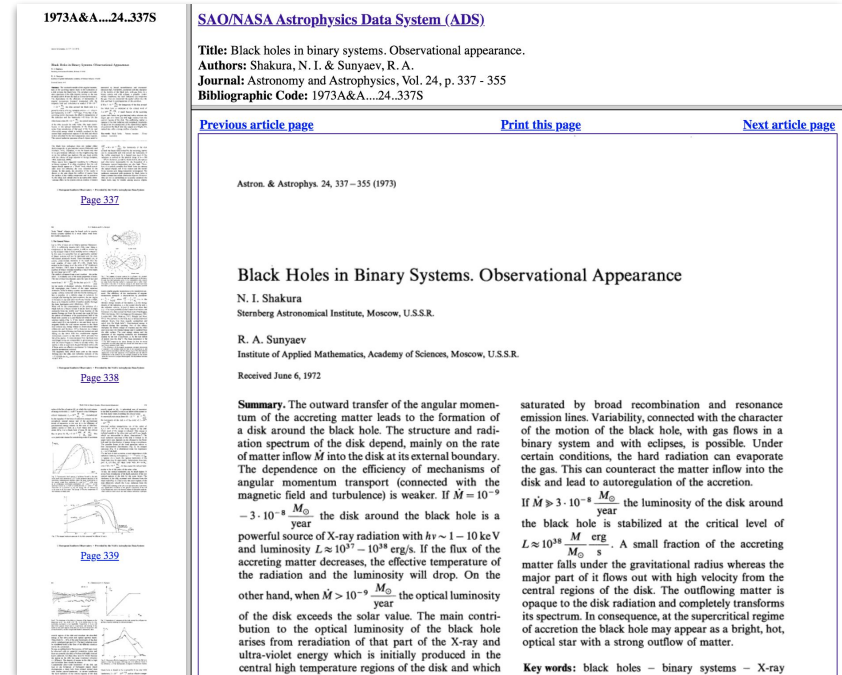


Myth 1: We're done with Classic Interface

Reality: while users have been transitioned off the ADS Classic search engine, legacy components still exist

ADS Article Archive

- 25yo system used to process and visualize digitized scans of historical literature
- Current holdings consist of 670k articles, 5M scanned pages, accounting for 1/3 of the refereed literature in astronomy
- Ingest pipeline involves rasterization, document bundling, OCR, fulltext extraction
- Scope of work: replace 50K lines of C/PERL, decouple from ADS classic, build into UI



1973A&A....24..337S

SAO/NASA Astrophysics Data System (ADS)

Title: Black holes in binary systems. Observational appearance.
Authors: Shakura, N. I. & Sunyaev, R. A.
Journal: Astronomy and Astrophysics, Vol. 24, p. 337 - 355
Bibliographic Code: 1973A&A....24..337S

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Astron. & Astrophys. 24, 337–355 (1973)

Black Holes in Binary Systems. Observational Appearance

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Received June 6, 1972

Summary. The outward transfer of the angular momentum of the accreting matter leads to the formation of a disk around the black hole. The structure and radiation spectrum of the disk depend, mainly on the rate of matter inflow \dot{M} into the disk at its external boundary. The dependence on the efficiency of mechanisms of angular momentum transport (connected with the magnetic field and turbulence) is weaker. If $\dot{M} = 10^{-9} - 3 \cdot 10^{-8} \frac{M_{\odot}}{\text{year}}$, the disk around the black hole is a powerful source of X-ray radiation with $h\nu \sim 1 - 10 \text{ keV}$ and luminosity $L \approx 10^{37} - 10^{38} \text{ erg/s}$. If the flux of the accreting matter decreases, the effective temperature of the radiation and the luminosity will drop. On the other hand, when $\dot{M} > 10^{-9} \frac{M_{\odot}}{\text{year}}$, the optical luminosity of the disk exceeds the solar value. The main contribution to the optical luminosity of the black hole arises from reradiation of that part of the X-ray and ultra-violet energy which is initially produced in the central high temperature regions of the disk and which saturated by broad recombination and resonance emission lines. Variability, connected with the character of the motion of the black hole, with gas flows in a binary system and with eclipses, is possible. Under certain conditions, the hard radiation can evaporate the gas. This can counteract the matter inflow into the disk and lead to autoregulation of the accretion.

If $\dot{M} \gg 3 \cdot 10^{-8} \frac{M_{\odot}}{\text{year}}$, the luminosity of the disk around the black hole is stabilized at the critical level of $L \approx 10^{38} \frac{M}{M_{\odot}} \frac{\text{erg}}{\text{s}}$. A small fraction of the accreting matter falls under the gravitational radius whereas the major part of it flows out with high velocity from the central regions of the disk. The outflowing matter is opaque to the disk radiation and completely transforms its spectrum. In consequence, at the supercritical regime of accretion the black hole may appear as a bright, hot, optical star with a strong outflow of matter.

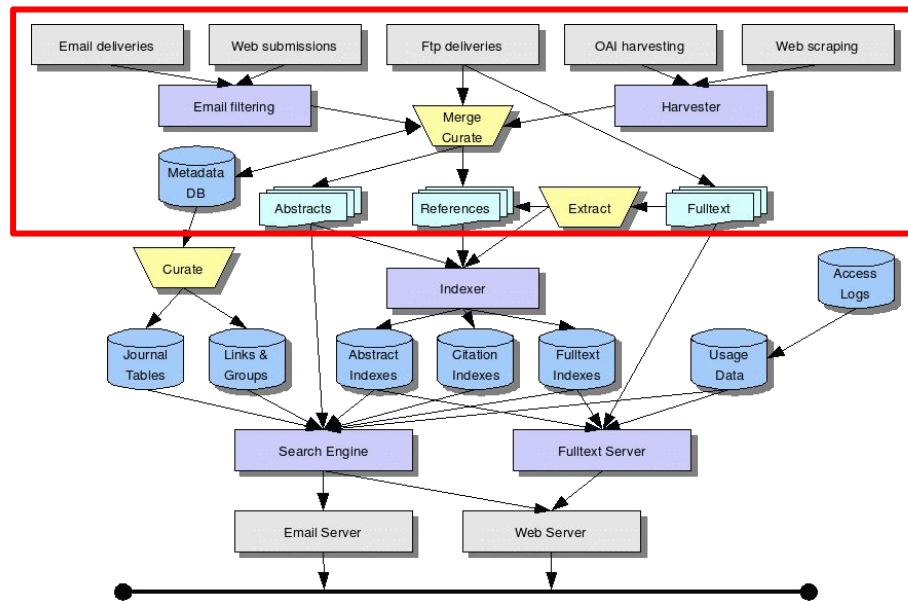
Key words: black holes – binary systems – X-ray

Myth 2: We're done with Classic Backend

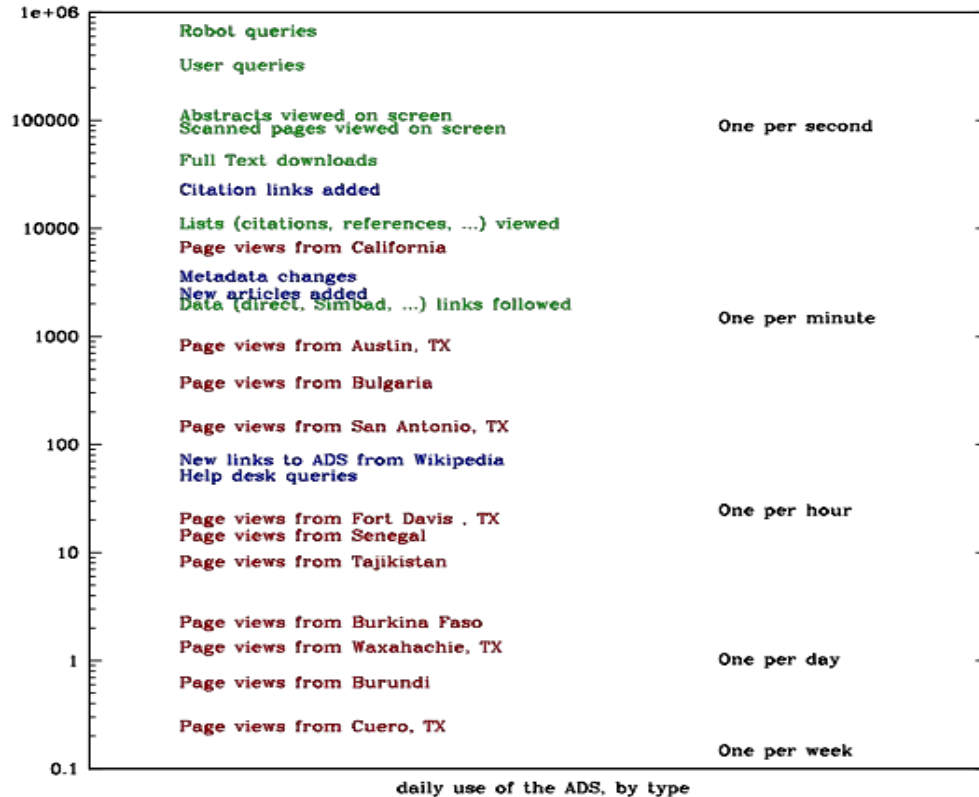
Reality: while front-end has been re-engineered, back-office curation and ingest processes need to be updated

Harvesting, Ingest and Curation

- Data harvesting relies on PERL code developed over the past 20 years
- Data extraction now uses a mixture of PERL and python (since 2018), flat files
- New ingest pipeline should allow indexing at a higher cadence (daily updates from publishers)
- Curation framework needs to be as efficient as existing one, while yielding better outcome (e.g. richer data model, unicode cleanliness, supervised metadata enrichment)



Why we need to be efficient



Events:

Page views

Curation activities

Search

Myth 3: We're done with the UI

Reality: the UI now consists of a mixture of JavaScript legacy code and React-based elements, needs updating

- New components are being developed or designed as we speak
 - myADS notifications
 - Libraries ownership management and sharing
 - Recommendations
- Code should be refactored and improved
 - Remove legacy code and develop under single framework
 - Build in functionality which will allow us to perform experiments (A/B testing, personalizations)
 - Improve speed and user experience
 - Improve mobile experience
 - Improve accessibility

Program for 2021-25

- Complete system transition, update back-end components
 - Both a “problem” and an “opportunity,” so make the best of it
 - Will take most of ADS’s oxygen for the next couple of years
- Curation and Ingest Improvements
 - Continuous improvement of infrastructure focusing on reliability, currency, scalability
 - Continuous improvement of content, indexing fulltext, cited literature, software, data products
 - Implement community practices for content updates and versioning (record aggregation)
 - Support metadata enrichment through supervised machine learning (e.g. affiliations, keywords)
- New Efforts and Initiatives
 - Expand data linking content and framework to use industry standards (DataCite, Scholix)
 - Expand use of machine learning to support recommendations, personalization, visualizations
 - Improve text mining capabilities (entity detection, anchor text embedding, topic analysis)
 - Build dashboard functionality for several use cases (single researcher, institutional metrics, etc)
 - Support collaborative authoring and research environments, e-publishing platforms