

*A presentation to The University Council of Jamaica on
“Improving quality in student academic records”*

Monday, March 8, 2021

Electronic Transcript Exchange: EDI, XML, PDF - Contrast and Compare

Presenters

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International Education Services



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Registrar



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Manger,
eTranscripts



– A [Professional Development Committee](#) of AACRAO



American Association of Collegiate Registrars and Admission Officers (AACRAO)

- **110+ years old**
- **12,000+ *members***
- **2,700+ *institutions***
- **40+ *countries***

The Role of Associations in U.S. Higher Education

- Creation of voluntary standards
- promote best practices
- professional development of people within the field of higher education
- Advocacy



AACRAO's Role

- Advocacy for institutional and student success
- Discovery, development and dissemination of best practices and standards
 - Meetings- National, State and Regional
 - Competencies and Professional Proficiencies
 - Custom training
 - Publications
- Engagement with the global higher education community

American Association of Collegiate Registrars and Admission Officers (AACRAO)

Areas represented within the university:

- Records & Academic Services
- Enrollment Management
- Domestic & International Admissions & Recruitment
- Transfer Admissions & Recruitment
- International Credential Evaluation



Mission, Vision, & Values

PURPOSE

The mission of the American Association of Collegiate Registrars and Admissions Officers (AACRAO) is ***to provide professional development, guidelines and voluntary standards to be used by higher education officials regarding the best practices*** in records management, admissions, enrollment management, administrative information technology and student services. It also provides a forum for discussion regarding policy initiation and development, interpretation and implementation at the institutional level and in the global educational community. For more information see the Association's Articles of Incorporation.

Mission

AACRAO's mission is ***to serve and advance higher education by providing leadership in academic and enrollment services.***

Values

Accountability --- Collaboration --- Inclusiveness --- Innovation --- Inquiry --- Integrity --- Learning

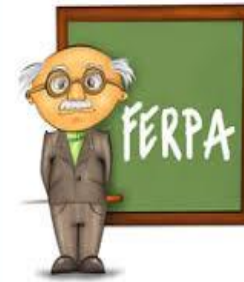


AACRAO Resources

Guidelines, Best Practices, Etc.

Engagement and Resources:

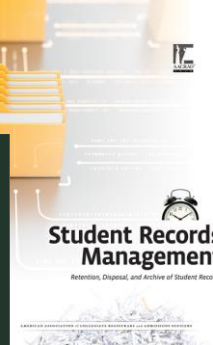
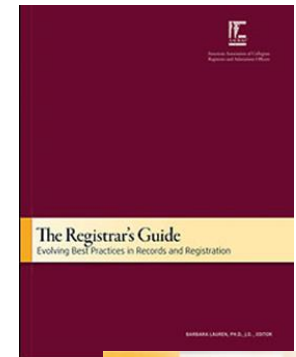
- Research Reports & Surveys
- Timely Initiatives
- Leadership & Guidance
- Implementation & Best Practices
- Workgroups and Special Projects
- Podcasts: Admit It and For the Record
- Diverse and Robust Opportunities for Involvement



Meeting the Moment: Transforming the Digital Credentials Space

AACRAO

February 2021
Wendy Kilgore, American Association of College Registrars and Admissions Officers (AACRAO)



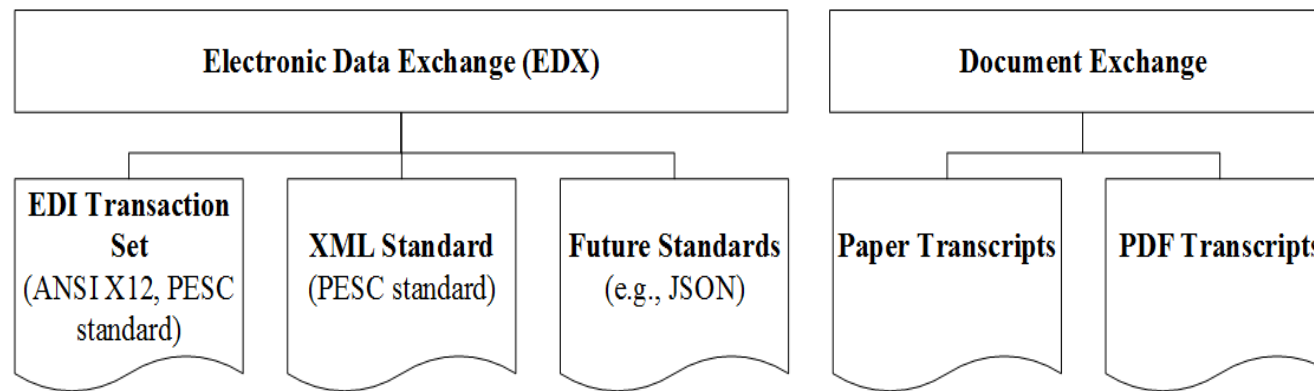
AACRAO's Role in Global Context

- Engage with Ministries, ENIC-NARICs, and higher education institutions outside of the United States to educate and inform on current U.S. practices
- Educate and Inform U.S. higher education institution on global events, and their impact on their international education programs, policies, and initiatives
- Advocacy and action toward strengthening global mobility network
 - Global Recognition Convention: U.S. voice
 - Policy Paper on Inclusive Admissions Policies for Displaced and Vulnerable Students
 - Groningen Declaration Network
 - General Data Protection Regulation
 - Understanding the U.S. Credit Hour

Helpful Glossary

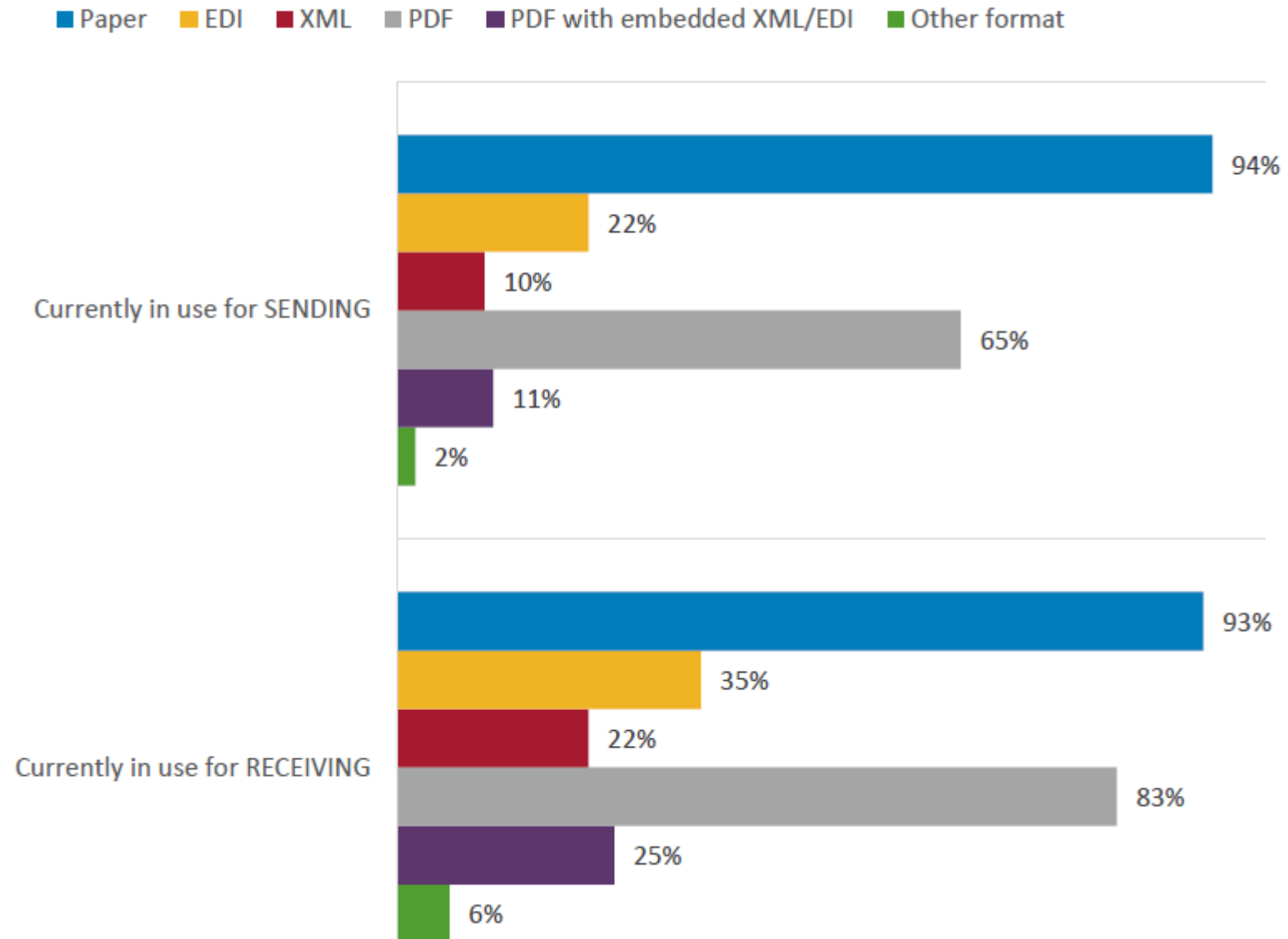
- **ANSI** – American National Standards Institute
- **EDI** – Electronic Data Interchange
- **EDX** – Electronic Data/Document Exchange
- **ERUG** – PESC Education Record User Group
- **IG** – PESC Implementation Guide
- **NCES** – US Department of Education's National Center for Education Statistics
- **PESC** – Postsecondary Electronic Standards Council
- **SPEEDE** – Standardization of Postsecondary Education Electronic Data Exchange
- **XML** – eXtensible Markup Language
- **X12** – ANSI Accredited Standards Committee (ASC) X12

Electronic Transcript Hierarchy



Source: Elliott, P. S. (2020). *Electronic data interchange transcripts: Organizational change in Maryland's implementation 1991 through 2008* (Order No. 27834974). Retrieved from ProQuest Dissertations & Theses Global. (2438608164).

Figure 1: Official Transcript Format Use



Source: Kilgore, W. (2019). *AACRAO September 2019 60-second survey results*. Washington, DC: AACRAO. Retrieved from <http://www.aacrao.org>



PDF History & Overview

- Portable Document Format (PDF) released by Adobe Systems in 1993
- Cooperated with ISO for standardized subsets
- Released as an open standard in 2008 – Adobe Reader is free, plus others
- Electronic image vs. electronic data
- Sending – Extract a dataset from SIS and spool to PDF document

PDF History & Overview (cont'd)

- Receiving – Institution must determine how to get data into system
- Authentication – Secure PDF signed and certified as authentic using digital signature
- Encryption – Provides a secure method of transmission using sender and receiver keys
- PDF files can have attachments, both at document-level and page-level.

PDF Transcript Challenges

- Email issues:
 - Email directed to spam filters
 - Bad email addresses
- Feature questions:
 - Security features can cause issues for uploading, expirations, etc.
- Do recipients accept PDF transcripts?
- Receiving efficiently



PDF Transcripts Benefits

- Create electronic transcript complete with colors, images and watermarks that mirror the official paper transcript
- Quickly and affordably deliver transcripts to institutions and businesses to verify degrees and coursework
- Customer service and expectations
- Cost reduction
- Fairly quick and easy implementation
- Supported by a variety of vendors
- Requires little technical knowledge





NAME: STUDENT, JOHN Q.
STUDENT NR: XXX-XX-1234
PRINT DATE: 05/15/2015
E

BIRTHDATE : 05/17/XXXX

Issued To: *** ISSUED TO STUDENT ***
DOCUMENTID: 0987654321
JOHN Q. STUDENT
John.Q.Student@colorado.edu

Requested By: JOHN Q. STUDENT

Degrees, Certificates and Licensure

Master of Arts DEC 20, 2015
CU Boulder
College Arts & Sciences GRAD
Major : Psychology

Other Institutions Attended:

HIGHER EDUC. World National University
INSTITUTIONS: DEGREE MAS 02/2008
REG. EFF. BAC 02/2006

03/98 - 02/08

Transfer Credit Applied:

World National University

GRAD SEM TRANSFER CREDIT 6.0

COURSE TITLE	COURSE NR	UNITS	GRADE	PNTS
----- Fall 2012 UC Boulder -----				
College Arts & Sciences GRAD				
Psychology				
Proseminar: Experimental Psychology	PSYC 5665	2.0	A	8.0
Intel Assessment Lab	PSYC 7663	1.0	B	3.0
Adult Psychotherapy	PSYC 7673	3.0	A	12.0
Intel Assessment/Practicum	PSYC 7683	3.0	A	12.0
Practicum Clinical Psychology	PSYC 7713	3.0	A	12.0
ATT 12.0 EARNED 12.0 GPAHRS 12.0 GPAPTS 47.00 GPA 3.917				
----- Spring 2013 UC Boulder -----				
College Arts & Sciences GRAD				
Psychology				
Accent Reduction	ESLG 1130	2.0	P	0.0
Proseminar: Memory	PSYC 5695	2.0	A-	7.4
Proseminar: Executive Function	PSYC 5825	2.0	A	8.0
ATT 6.0 EARNED 6.0 GPAHRS 4.0 GPAPTS 15.40 GPA 3.850				
----- Fall 2013 UC Boulder -----				
College Arts & Sciences GRAD				
Psychology				
Cognitive Psyc Research Update	PSYC 6605	1.0	P	0.0
Master's Thesis	PSYC 6951	4.0	A	16.0
Tpcs-Cognitive Science	PSYC 7775	1.0	A	4.0
ATT 6.0 EARNED 6.0 GPAHRS 5.0 GPAPTS 20.00 GPA 4.000				
----- Spring 2014 UC Boulder -----				
College Arts & Sciences GRAD				
Psychology				

----- Fall 2012 UC Boulder -----
College Arts & Sciences GRAD Psychology

Proseminar: Experimental Psychology PSYC 5665 2.0 A 8.0

Intel Assessment Lab PSYC 7663 1.0 B 3.0

Adult Psychotherapy PSYC 7673 3.0 A 12.0

Intel Assessment/Practicum PSYC 7683 3.0 A 12.0

Practicum Clinical Psychology PSYC 7713 3.0 A 12.0

ATT 12.0 EARNED 12.0 GPAHRS 12.0 GPAPTS 47.00 GPA 3.917

----- Spring 2013 UC Boulder -----
College Arts & Sciences GRAD Psychology

Accent Reduction ESLG 1130 2.0 P 0.0

Proseminar: Memory PSYC 5695 2.0 A- 7.4

Proseminar: Executive Function PSYC 5825 2.0 A 8.0

ATT 6.0 EARNED 6.0 GPAHRS 4.0 GPAPTS 15.40 GPA 3.850

----- Fall 2013 UC Boulder -----
College Arts & Sciences GRAD Psychology

Cognitive Psyc Research Update PSYC 6605 1.0 P 0.0

Master's Thesis PSYC 6951 4.0 A 16.0

Tpcs-Cognitive Science PSYC 7775 1.0 A 4.0

ATT 6.0 EARNED 6.0 GPAHRS 5.0 GPAPTS 20.00 GPA 4.000

----- Spring 2014 UC Boulder -----
College Arts & Sciences GRAD Psychology

PDF Sending Best Practices

- Utilize security within the PDF
 - Blue Ribbon Security
 - Digital signatures
 - Watermark background
 - Document expiration?

[PDF Best Practices](#)



PDF Sending Best Practices (cont'd)

- Use secure transmission methods
 - Vendor networks
 - Multiple-step authentication
 - No direct email attachments
 - Don't lock it down so tight the receiving institution cannot process the transcript

PDF Receiving Best Practices

- Coordinate with primary trading partners
 - Use other methods for institution-to-institution transmission
- Maximize the benefit of electronic
 - Batch download or SFTP direct to your shares
 - Import, classify, index
 - OCR: templates or intelligent capture
 - Workflows and exception handling

Do PDF Transcripts Save Time & Money?

Sending

- Reduced paper
- Can be sent anywhere
 - securely
 - easily
 - quickly
- Misrouting in rare scenarios
- Relatively low cost to implement

Receiving

- Transcripts arrive quickly
- Admissions processing time reduced
 - Faster transfer credit evaluation
 - Speeds up Admission decisions
- Automation opportunities
- Low cost

Do PDF Transcripts Save Time & Money?

- Example: One University's Transcript Processing

Note: Numbers shown are pre-COVID

Difficult
during
pandemic

Even more
challenging
during
pandemic

Format	Time to arrive	Time to post into SIS
Paper	Up to 5 days (regular mail)	Up to 30 business days ^o
PDF	Within 1 day of order	Up to 30 business days ^o
EDI/XML	Within 1 day of order	By the next morning

EDI Format

- Delimited – like a CSV file
- Named “Segments”
- Mixture of Optional and Required fields and segments
- Multiple Occurring and Nested Segments

EDI Format Example

SES|200507|1|||Fall 2005;
SUM|U|4|N|||1|||3.33;
CRS|R|U||1|01|B+|||82|0014.000|3.33||CECN|801|Principles of Eng Economics;
SES|200601|1|||Winter 2006;
SUM|U|U|N|||1|||3.67;
CRS|R|U||1|01|A-|||3.67||CVL|425|Hydrology and Hydraulic Eng;
SES|200609|1|||Fall 2006;
SUM|U|U|N|||1|||3.67;
CRS|R|U||1|01|A-|||3.67||CVL|324|Geotech Properties of Soil I;

Delimiter

Named Segment


Empty – i.e. Optional Fields

Segment Terminator

EDI Process Considerations

- Technical complexity limits some institutions
- Need for translation software or SIS compatibility to recognize full benefits
- Data mapping can be cumbersome
- Perception of complexity or lack of IT resources
- Many small important setup details, but it's only done once

EDI Process Benefits

- Standards are consistent
- Resources are available
- Processes can be batched and automated
- Large volume of current institutions using standard
- Efficient transmission of data with the least amount of characters necessary
- State/Province and district initiatives
- Sender and receiver are identified
- Automated acknowledgements of both delivery and receipt possible
- Transmission through an exchange network benefits trading partners
- Costs decrease
- “Speede” delivery 

What is XML ?

- Based on IBM's 1970s development of a **G**eneralised **M**arkup Language (**GML**) and ISO's 1980s **S**tandardized **GML** (**SGML**)
 - A markup language much like HTML
- Designed to:
 - carry data, not to display data
 - be self-descriptive and human-readable
 - reference a *schema* – a template for constraints around the data content

XML Snippet

```

:
</TransmissionData>
  <Student>
    <Person>
      <SchoolAssignedPersonID>309032191</SchoolAssignedPersonID>
      <AgencyAssignedID>582425187</AgencyAssignedPersonID>
      <Birth>
        <BirthDate>1989-06-12</BirthDate>
      </Birth>
      <Name>
        <FirstName>Kristen</FirstName>
        <MiddleName />
        <LastName>Young</LastName>
      </Name>
      <Gender>
        <GenderCode>Female</GenderCode>
      </Gender>
    </Person>
  :

```

Start tag

End tag

Data (*bold for emphasis*)

Empty tag (i.e. optional)

“Word code”

XML Considerations

- Syntax is...
 - Significantly larger than EDI
 - Can result in higher storage, transmission and processing costs
 - Verbose, especially for human readers, relative to other alternatives
 - (Number & length of tags) + (Start & End duplication) = more to sift through
 - Can result in performance impacts

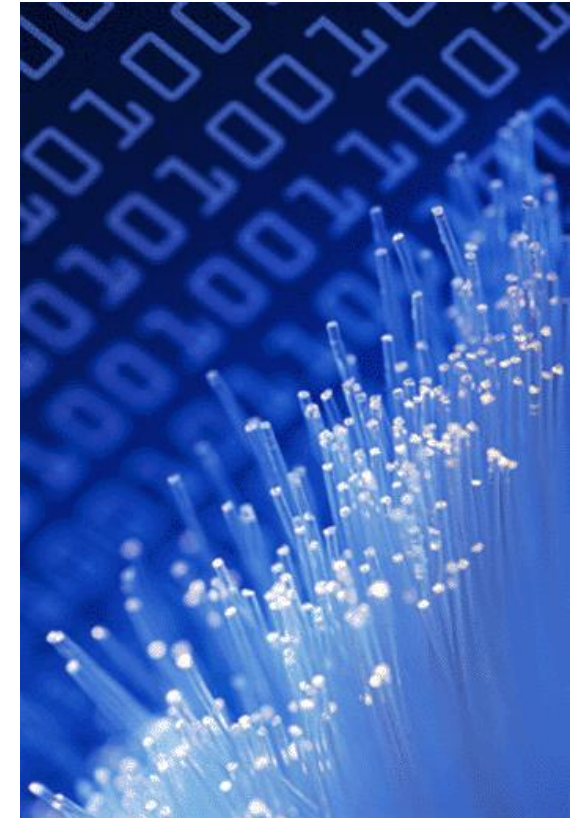
less critical for
today's technology
than for humans



Source: [The Brain Vine](#)

Key Benefits of XML

- Content identification
 - Enforced structure
 - International standard
 - Industry standardization
- } = Data quality
- } = Process efficiency



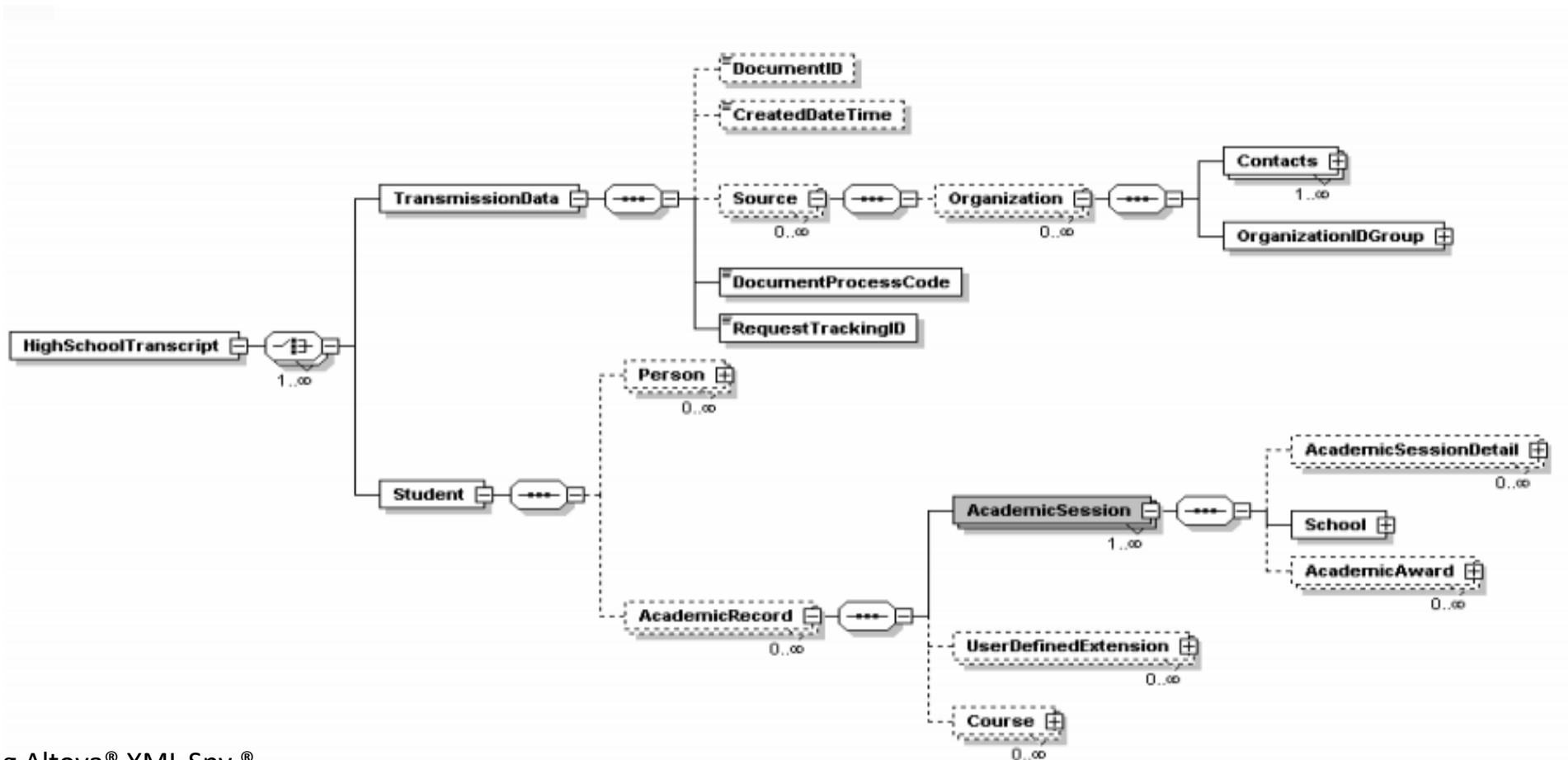
Additional XML Benefits

- Supports Unicode data
 - information in most written human languages
 - “symbols” (e.g., scientific, mathematical, etc)
- Tags are “words”, not abbreviations like EDI
- Platform-independent (relatively immune to technology changes)
- As with EDI, reduces data entry time & improves data quality

Additional XML Benefits (cont'd)

- Forward and backward compatibility are relatively easy to maintain despite changes in schema
- Postsecondary Electronic Standards Council ([PESC](#)) XML standards
 - Transcripts (High School and Postsecondary) + other documents
 - Acknowledgements (aid reconciliation & non-repudiation/trust)
- PESC XML usage is increasing in North America and internationally
- Crosswalks are available between EDI and PESC XML
- Major SIS vendors enable inbound and outbound XML

PESC XML Schema Visualization: High School Transcript



EDX Institutional Considerations

- Capabilities of the organization
 - IT resources available
 - Interest level of senior management
 - Compatibility with SIS
- Cost/benefit analysis
 - In house vs. vendor sponsored solution
 - Efficiency gains
 - Process reengineering
- Strategic goals
 - Preferred trading partner methodologies



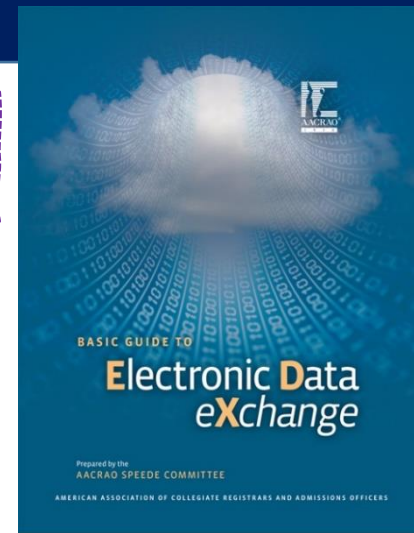
In Summary: PDF, EDI and XML

Advantages for Institutions & Learners

- Electronic data exchange assists and enables:
 - Student *mobility*
 - Student, credit and credential *transferability*
 - Removing barriers to *student access*
 - Admissions & Records office *business continuity*
 - System and business process *interoperability*

EDX Resource available via
[AACRAO Publications!](#)

Available Resources



- **AACRAO Publications**

- AACRAO offers a valuable library of resources on many higher education topics. For a listing of recent publications, please visit <https://www.aacrao.org/research-publications>

- **AACRAO Professional Development**

- AACRAO offers professional development opportunities through meetings, online classes and webinars. For more information, please visit <https://www.aacrao.org/events-training>

- **AACRAO Best Practices for PDF Transcript Exchange**

- Compiled list of best practices for PDF transcript exchange. For more information, please see <https://www.aacrao.org/resources/electronic-records-data-exchange/aacrao-best-practices-for-pdf-transcript-exchange>

Available Resources (cont'd)

- **SPEEDE Committee website**

- Links to educational resources, helpful tips and others in the higher ed community involved in the electronic exchange of educational data. For more information, please visit <https://www.aacrao.org/resources/electronic-records-data-exchange>

- **PESC website**

- Access to the free, open standards developed by PESC, information on current initiatives and the on-going work of PESC. For more information, please visit <https://www.pesc.org>

Registrant Lists and Activity Reports

Note: Examples shown are from the SPEEDE Server hosted by the National Student Clearinghouse (<https://speedeserver.org/>)



SPEEDE Server is an electronic data exchange server that allows free, open and secure exchange of education documents and data between institutions and solution providers. SPEEDE is utilized when partnering schools need a mechanism to safely and securely exchange education documents between them.

[Overview](#) | [Using SPEEDE](#) | [Using PGP](#) | [FAQs](#) | [Registration](#) | [Reports](#)



RESOURCES:

- [Quick 'n' Easy Utility](#)
- [AACRAO SPEEDE Committee](#)
- [Apply Texas](#)
- [PESC](#)
- [TREx](#)

SPEEDE SUPPORT:

SPEEDE-support@studentclearinghouse.org

ARE YOU A STUDENT?

If you need help or to order a transcript, please go [here](#).

Reports

[Overview](#) | [Using SPEEDE](#) | [Using PGP](#) | [FAQs](#) | [Registration](#) | **Reports**

Registrant List

Contains the name, contact information, and state for each individual who has registered with the SPEEDE Server.

Registrant List Changes

Contains changes made during the previous month to current registrant contact information, as well as new registrants for the month.

Cumulative Report

Cumulative monthly report of the total number of files processed by SPEEDE. It includes the TS130, TS 131, TS 997, and TS138 transaction sets; total number of documents; and the number of senders and receivers for Transaction Set 130.

Server Receiver & Sender Reports

Identifies who sent and received files and file count by transaction set (TS130, 131, and 146) for each registrant who received files during the month.

Report Type: ☐ Receiver ☐ Sender

me Tools usage.pdf x

☆ ☁ 🖨 🔍

9 / 9

139%

SAMPLE

Bookmarks

- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011

Year	Month	TS130 Transcr	TS131 Tran Acks	TS997 Fun Acks	TS189 Apps	TS138 TSTSCR	TotalDocs	Sndrs130	Rcvrs130
2020	January	155419	34070	32699	158363	3887	561168	206	432
	February	146084	27554	27925	130224	1239	475409	208	397
	March	101943	139039	24340	80375	1062	377190	204	359
	April	102032	192658	30869	101301	401	453077	199	390
	May	158176	275992	31140	110588	363	627347	201	398
	June	312884	529724	43425	92704	473	1027416	202	421
	July	167348	251627	38943	93086	765	592581	201	403
	August	162906	171609	25118	119237	1277	509896	197	408
Total		23634645	21623890	5134888	22908078	2130537	83212541		

Cumulative totals since 1996!

Q&A and Follow-Up

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SPEEDE Google Group: speede-g@vt.edu