

Phynancial¹ Statements and Physics: Information Friction and Newton's Laws

Reducing *information friction*:
Facilitating continuous auditing
(and XBRL helps)

Preliminary
version

1. Sit Ubu sit. Good dog.
2. <http://www.gutenberg.org/files/16884/16884-h/16884-h.htm>



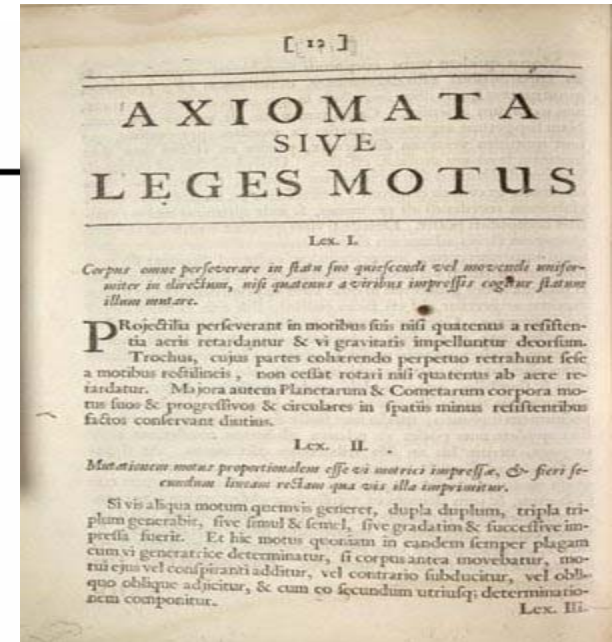
Agenda

- How does physics and especially the concept of friction apply to business and financial reporting information?
- Good friction and bad friction
- Where XBRL comes in

Physics and Financials



Newton's Laws of Motion



"Every object persists in its state of rest or uniform motion in a straight line unless it is compelled to change that state by forces impressed on it."

"Force is equal to mass times acceleration ($F = m a$)."

"For every action, there is an equal and opposite re-action."

- *In the absence of other forces, data should be able to continue its course from transaction to end report at the speed of business. Information friction is the primary force acting on that data.*
- *Force should be related to materiality, risk and severity of rules*
- *For every debit, there is an equal and opposite credit?*

Good and Bad Friction

The Nature of Friction

- Friction is our friend
 - Keeps things in place
 - Mouse pad
 - Slows things down
 - Car brakes
 - Grips
 - Soap, babies
 - Smooths
 - Sand paper
 - Heats/ignites
 - Matches
- Friction and problems
 - Keeps things in place
 - Slows things down
 - Grips
 - Smooths
 - Blisters
 - Heats/ignites



Symptoms of Information Friction

- Heavy manual labor, major reliance on spreadsheets
- Low reliance on standard reports (need to triple-check)
- Today's answers are for yesterday's questions
- Low or no reconciliation between data sources (constant need for gap analysis)
- Heavy reliant on key personnel

Reducing Friction Changes Things

- Manual processes
 - Individual integrity
 - Customized review
- Judgmental/statistical
- Who reads logs
 - Only after the fact?
- Automated processes
 - Group integrity
 - Automated review
- Exception-based
 - Triggers for customized review
 - Logs
- Systems are:
 - Predictable
 - Reliable

Value of Reducing Friction

- Lower cost
- Less wear/loss
- Reduced heat
 - Reduced need to overcome/compensate
 - Reduced effect of heat

Overcoming Friction

- Adding in a layer of abstraction
 - WD 40



Living Frictionless

- Need retro-rockets, other forces
- Or introduce friction

The only tools one
needs in life:
WD40 to make things go
and duct tape
to make them stop

Causes of Data Friction

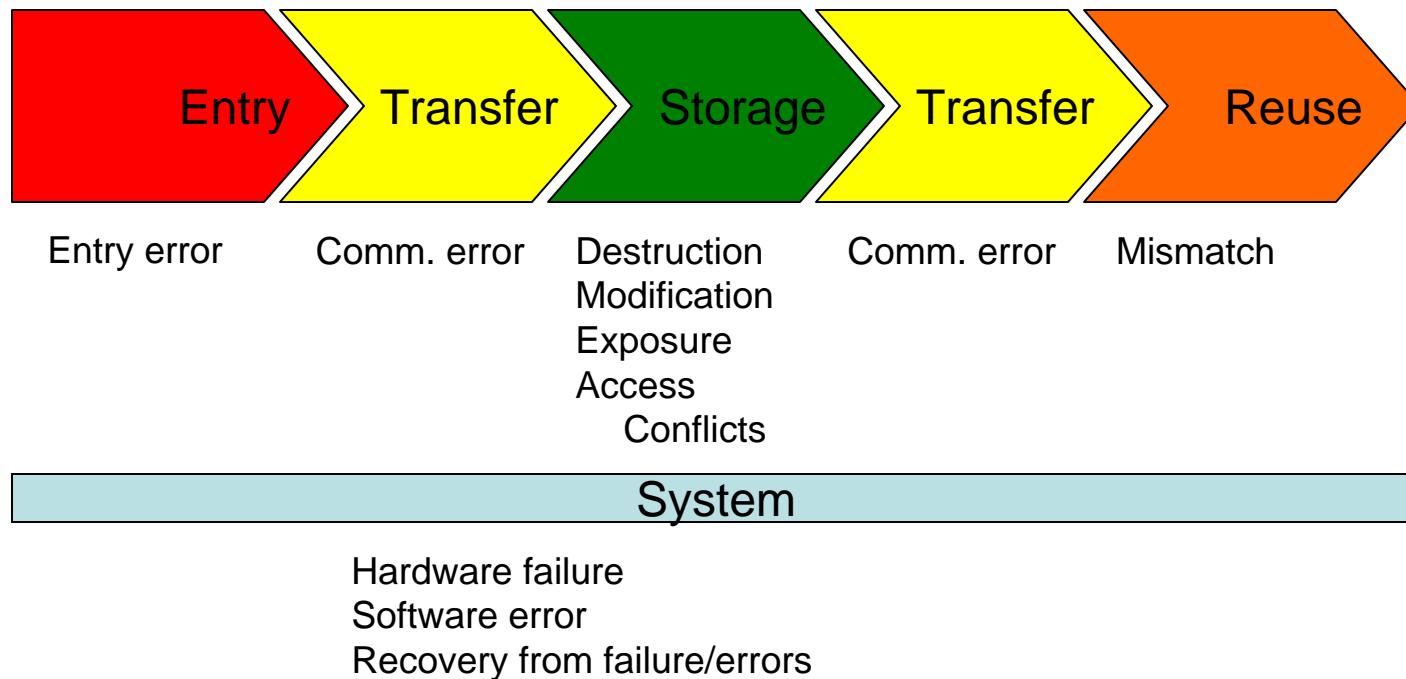
- Bandwidth, latency
 - People, politics and rules
 - Politic environment, regulation – people power struggles
 - Governance
 - Personnel
- Data issues
 - Data is not understood
 - Seen from different perspectives
 - Data structure matchup
 - Users disagree on data definitions and the name of the data items
 - Data “mapping: matchup (different codes, index, key fields) – dirty data
 - Data redundancy
 - Data is not shared – or with great reluctance
 - Indexing (finding what is necessary)
 - “Missing” data – not collected by systems but needed by others
 - Historical data is not available; preserved only for one or two years; archived data is not consistent with current formats
- Business processes and rules
 - Not “just” different software, but business process matchup
 - Different business rules applied
 - Timing of entries, of period end processes, cutoff
 - Privacy concerns/HIPAA
 - Allocations, measurement, accounting treatment (lease/buy)
 - Report inconsistency
- Outside forces
 - Reliance on third party data (address check, credit check, logistics, rebates, warranty)
 - Human interpretation requirement (clerk not skilled enough and requires manager; estimates, approval processes)
 - Outside influence (auditor, government)
 - Unknown (commitments and contingencies)
 - Lack of knowledge/willingness to collect data to support “end” requirements
- Systems
 - Physical/virtual connection – existence (manual entry)
 - Storage/retrieval; where is the data

Forces Affecting Data

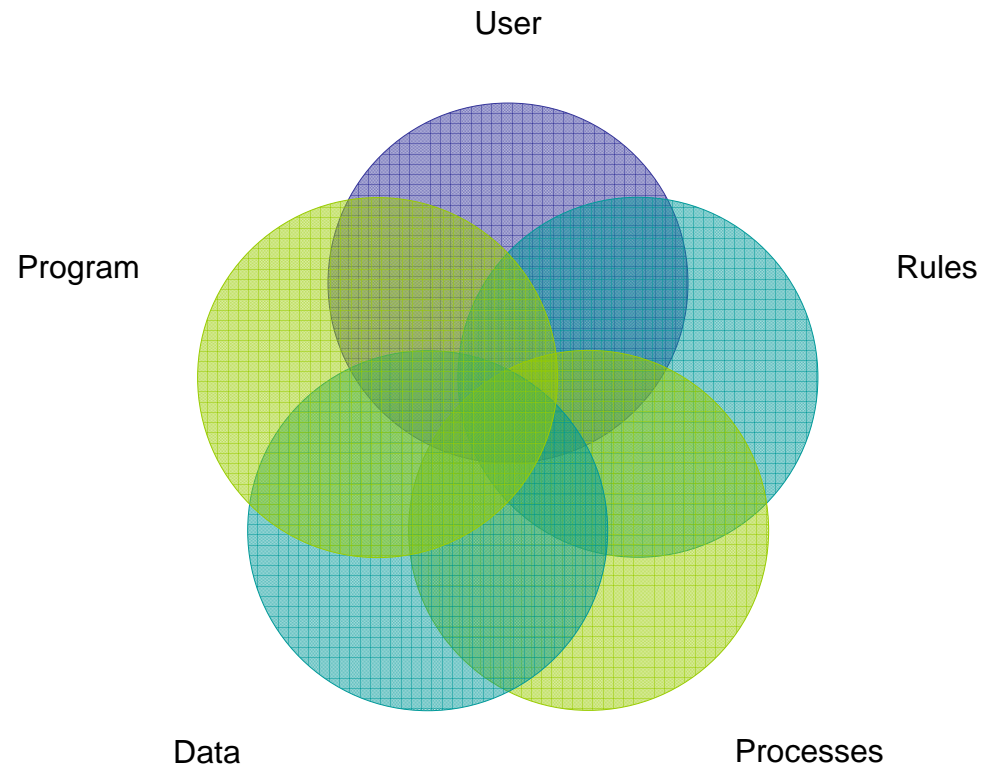
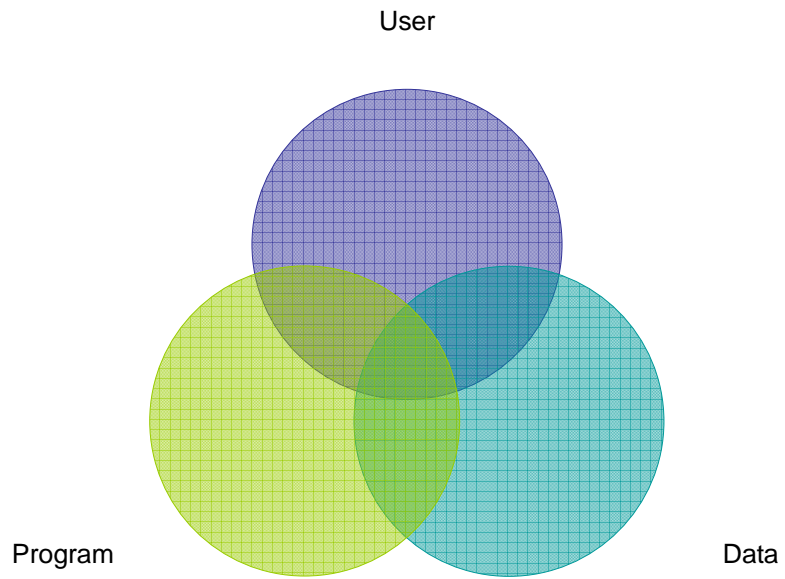
- Bottlenecks
 - Manual processes
 - Automated process
 - Monitoring
 - Transformation
 - Moving
 - Communication and transport

Clark Wilson

Assurance = Reliability, Predictability



Clark Wilson



Where XBRL Comes In



Abstract is Good

- New layer of abstraction
- Operate on abstract copy while original proceeds forward
- Catch up with effect
- Trail allows roll-back
- Evaluate roll-backs and non-rollbacks
- Later events can help validate earlier entries



- Standardized data is smoothed data

Background

- An Architecture for Auditable Advanced Transaction Oriented EDP Systems, Roger Dean Schultz, 1979
- David D. Clark and David R. Wilson "A Comparison of Commercial and Military Computer Security Policies." IEEE Symposium of Security and Privacy, 1987, pages 184-194.
- Report of the Invitational Workshop on Integrity Policy in Computer Information Systems (WIPCIS), January 1989, NIST Special Publication 500-160

Questions?



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