Good for all in the digital world: geeks[*], unicorns[†] and European public values

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Abstract

The European Commission and Europe's political leaders have great ambitions for digital transformation to deliver public services and economic growth in ways that are compatible with European public values.

A high quality, digitally-transformed education system plays a major role in this vision. Considerable investment is being made to develop borderless higher education and a mobile workforce. One of the most significant developments is the European Universities initiative in which a number of EUNIS institutions are participating.

However, the grand aims of digital transformation and transnational collaboration are all too often mired in the realities of inefficient business processes, poor data quality and lack of interoperability. Moreover, the more we open ourselves up to Europe-wide and global collaboration, the more we fear loss of sovereignty over our data, infrastructure and processes.

This paper investigates what EUNIS stakeholders (who include individuals, universities, NRENs and suppliers) can do to ensure that growth and collaboration can happen in ways that are compatible with European public values. We look at how the 1EdTech community is developing a technical ecosystem in line with these values and we review work in the Netherlands led by the Dutch NREN, SURF, as an example of good practice in this area.

If accepted for the Congress, the session will be organized as a panel discussion with representatives of EUNIS stakeholder groups.

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[*] Geek was originally a slang term for someone eccentric and is now used generally to describe technical experts.
[†] A unicorn is a mythical animal and also a term for a start-up company (usually technical) that grows very fast.

1 Background

Europe is not letting the digital revolution pass it by. Scale-up Europe (Sifted 2022a) is an initiative proposed by President Emmanuel Macron of France. During 2021 it brought technology leaders together to develop an actionable strategy to be presented to European heads of state during the French presidency of the European Union. The initiative focuses on four key drivers: talent, investment, start-up/corporate collaboration and deep tech. The aim is for Europe to become home to 10 'unicorns' i.e. private start-up companies valued at more than €100 billion by 2030.

There is a role for higher education to play in workforce development, innovation, knowledge exchange and collaborative R&D in such a scenario. Read more about education priorities for the French EU Presidency in the article by Cedefop (2022). Some of these high-tech 'unicorns' may indeed be spin-offs from our own research activities. Innovation is increasingly important in HE institutions - in recent years most HE organizations have introduced top level roles for boosting innovation, start-up incubation programs, etc.

At the 2017 Gothenburg Summit, EU leaders outlined a vision for education and culture. One of the initiatives was the development of 'European Universities'. These were designed to be transnational networks enabling students to obtain a degree by combining studies in several EU countries and contribute to the international competitiveness of European universities.

- In 2019, 17 alliances involving 114 HEIs were funded.
- In 2020, 24 further alliances involving 165 HEIs were funded.
- In 2021, a third funding round (€262 million), opened and results will be announced in 2022.

By January 2022 there were still many practical barriers to the desired collaboration and the 'Proposal for a Council Recommendation on building bridges for effective European higher education cooperation' (European commission 2022) calls for action at institutional, regional, national and EU levels to facilitate this type of co-operation.

The report calls on actors at all levels to: '*Support the development of high-quality virtual collaborative learning as an integral part of teaching, learning and research, to foster and facilitate inclusive and student-centered transnational cooperation, that complements face-to-face interactions*'

There are other specific recommendations that touch immediately on the responsibilities of the EUNIS member community: *Support European Universities alliances and similar institutionalized cooperation models in their efforts to pool expertise and resources to develop and implement joint digital strategies and shared interoperable IT infrastructure ...*

Support the piloting and testing of open-source solutions to overcome common challenges, thus contributing to the interoperability, digital readiness, data sovereignty and responsibility of higher education systems.

So, with a precise mandate for action at all levels (and funding to back it albeit a limited amount given the scope of the ambitions) we look at what this means for EUNIS members. How do we work with geeks, unicorns and mainstream technology companies whilst maintaining digital sovereignty and not losing sight of our European public values (EPRS 2020)?

2 Good for all in the digital world: principles

2.1 Openness

Sharing and openness is part of our culture and we talk about promoting open data, open learning resources and open science. The European Commission recommendation makes specific reference to open-source software and the Digital Education Plan includes ambitions for a Digital Education Hub of open educational resources. What often gets overlooked, however, in talking about the spirit of sharing

and openness, is how you make this happen. To achieve this, our digital infrastructure needs to be underpinned by open standards and our ways of working need to be characterized by a culture of openness ('open by design').

The learning ecosystem is underpinned by a stable core of open standards developed and managed by community effort led by IMS (to be known as 1EdTech from May 2022). The best-known, and most widely used in higher education, of these standards is LTI (learning tools interoperability).

The good thing about IMS 1EdTech standards is that they are used by all of the major vendors so any other tools, whether they be open source, in house or from a local start-up, can be integrated into a plug and play ecosystem. Open educational resources are only really free and open if they can be easily integrated into your own learning environment, so they need to be packaged in a way that complies with open standards. Technical openness, however, is not enough - it needs to be complemented by the right behavior and culture within the institution or supplier organization.

2.2 Accessibility

Open educational resources are also only really free and open if they are accessible to all potential users. Europe is leading the way in requiring accessibility through legislation but regulation can only go so far in ensuring that digital systems and content apply best practice in all areas.

The best way to make a system or resource accessible to an individual is by meeting an individual's particular needs immediately within the learning context. Accessibility by design is also served by applying relevant open standards. Developers who follow relevant specifications and guidelines increase accessibility in two ways:

- good practice guidance contained within the implementation documentation
- because accessibility often relies on interoperability between learning applications, software, content and assistive technologies. Following relevant industry specifications helps ensure that applications, software, and content conform to standard operating system protocols, and thus make it more likely that assistive technologies will be able to operate with them.

IMS guidelines (IMS 2012) are a good starting point for understanding the issues and possible solutions.

Figure 1: accessibility as one of the first barriers to a valuable learning experience.

When considering accessibility of learning applications, it is important to understand the differences between two types of access: *equivalent* and *alternative*:

Equivalent access provides the disabled user with content identical to that used by the non-disabled user using a different modality. Providing a course textbook in Braille format or in digital format are examples of equivalent accessibility.

Alternative access provides the disabled user with a learning activity that differs from the activity used by the non-disabled user but designed to achieve the same learning objectives.

Equivalent access should be provided whenever possible. Alternative access brings with it a range of equity issues (particularly when applied to assessment).

Designing for accessibility benefits everyone. Not only is it more equitable, to design for the maximum possible range of users at the outset, it also makes good business sense compared to the effort in trying to find workarounds to specific problems every time they arise. Improved accessibility leads to higher quality and a better experience for all users.

2.3 Privacy and security

One of the potential problems about being open is that you can be too open. Europe has some of the world's strictest privacy laws and our data controllers can be very nervous about issues such as interoperability in case APIs used by suppliers result in them acquiring data they should not be able to access or in case data is transferred to other parties.

Fortunately, IMS 1EdTech standards offer a solution to this issue as well. The 1EdTech approach is summed up in these five principles.

1. **Data Minimization**: n*ever ask for more than you need or offer more than asked for.*

2. **Anonymization and/or Pseudonymization**: *any application that needs personal information is constructed such that it can operate only with the anonymized or pseudonymized form of that information.*

3. **Behavioral Documentation and Interrogation**: *verifiable documentation that describes the application's use and handling of personal data, including which personal data it needs to operate correctly, and which personal data it exposes to users and/or other applications.*

4**. Supportive data interchange protocols**: *specifications that define the protocols used for data interchange between systems are required and enable practical adherence to the Data Minimization and Anonymization/Pseudonymization principles.*

5. **Support for privacy-related administrative workflows**: *enables the institution to act quickly and efficiently on user requests, and also allows the institution to monitor that e.g. data retention policies are followed.*

It is not possible to mandate a single method to ensure privacy, so IMS 1EdTech specifications come with a range of acceptable approaches to choose from:

1. Ensure that fields containing personal data are optional in the specification so that you can miss them out and still have a valid payload.
2. Replace the personal data with something else that is either anonymized (non-reversible) or pseudonymised (reversible).
3. Use OAuth and put the personal data in a special 'bucket' to which you need an extra key.

A similar approach is being taken to security. There is an IMS 1EdTech security framework covering the trusted exchange of student data (IMS 2021).

2.4   Diversity and inclusivity

This may sound like a value that is vaguer than the previous topics and less immediately applicable to developing and managing IT infrastructure and services but it is absolutely fundamental and extremely relevant to the way in which we develop digital technologies.

The issue is summed up in a quote from Cathy O'Neil '*Algorithms are opinions embedded in code*.' (O'Neil 2016). Unintended biases can have serious consequences particularly when we are dealing with artificial intelligence and the use of analytics to make judgement.

Issues such as inappropriate gender stereotypes built into Siri and Alexa often make the news and they are just the most obvious examples. Statistics on gender and ethnicity show that white males are overrepresented in the workforce of the world's major technology companies. It is therefore unsurprising that their code reflects a particular worldview and unconscious assumptions, that go unchallenged at the design stage, result in unintended consequences in the technologies they deliver.

3   Developing an open European ecosystem

The elements described above lay the foundations for an open and interoperable ecosystem for European higher education. The ideal ecosystem that fits European public values is:

- Built on open standards
- Accessible
- Assures data privacy
- Secure
- Makes ethical use of artificial intelligence/algorithms

Interoperability offers the opportunity to switch between systems and to mix open source and commercial products. This is very different to 'intraoperability' where a supplier creates a monolithic closed ecosystem within which their own services are seamlessly integrated (VSNU 2021).

An ecosystem built on these foundations is also connected to the wider ecosystem of borderless education and training and workforce mobility within Europe and is readily able to participate in global collaboration.

We have concentrated on the details of the learning ecosystem (summarized in the diagram below) where development is led by the IMS 1EdTech community of which EUNIS is an active member. That ecosystem also relies on open standards developed by other bodies particularly in the areas of identity management and security. The IMS 1EdTech approach is to address and solve interoperability pain points and only to develop new standards where no suitable solution already exists.

Developing an ecosystem with the characteristics outlined above can help nurture 'unicorns' because the use of open standards and insistence on compliance with European values helps 'level the playing field' for new entrants to the edtech market. The term 'unicorn' was coined to describe privately owned technology companies with a value of over $1 billion (President Macron's aim to create 10 companies worth over one hundred billion dollars each is rather more ambitious). The mythical creature is used to signify the rarity of such companies. It has the added advantage of romanticizing the status in a way that terms such as 'mega rich' don't really achieve because the unicorn is also associated with healing powers and purity. Let's not forget that the term was coined by venture capitalists and relates to the financing of the company, not its ethics. Unicorns may not be all they seem[‡].

Few of the start-ups, spin-offs and scale ups the higher education sector works with will become unicorns but it is important to ensure that all our supplier partners are aware of European public values

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[‡] An unintended consequence of the interest in unicorns is that the unfortunate narwhal was hunted in mediaeval times for its tusk which was passed off as unicorn horn and sold for many times its weight in gold.

and what is required to comply with those expectations. The theme of EUNIS22 is 'Good for all in the digital world' and the idea of technology for social good is one that is gaining increasing attention. EdTech has a relatively good track record in this area. A report into technology for social good companies in the UK (Tech Nation 2018) found that EdTech companies were the second largest category of social good companies[§]

What can we do to ensure that our public/private partnerships reflect our values and reinforce the value of higher education as a social good? We take a look at how one NREN is addressing this issue and suggest some pointers for different stakeholders in the EUNIS community.

4 Example from the Netherlands

SURF (the Dutch national research and education network) is working with stakeholders in higher education and across the education sector as a whole to address the theme of 'organizing sovereignty'. The issues and proposed approaches are laid out in an advisory report on public values (VSNU 2021).
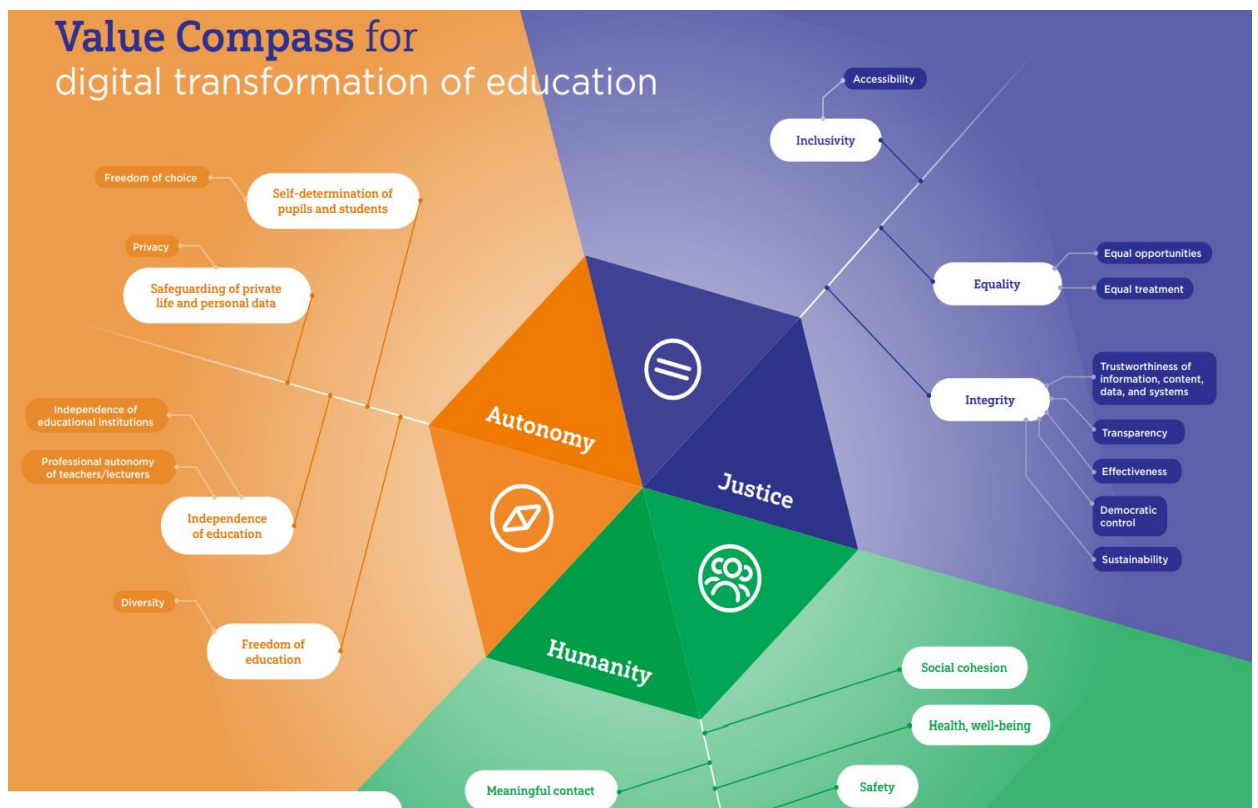

Figure 2: the SURF and Kennisnet Values Compass

[§] The largest category was in the advertising sector and the report authors noted that some of these companies *'fit awkwardly into the mould'* of social good.

4.1 Defining values

SURF has recognized that core values of the education sector, which may have seemed self-evident in the past, are coming under pressure in the drive for digital transformation. Working with Kennisnet (a similar organization for primary and secondary education in the Netherlands) they have developed a framework to structure digital transformation based on values.

The framework, known as the Values Compass (Kennisnet and SURF 2021), takes justice, humanity and autonomy as its core values. It recognizes that each of these values may be weighted differently depending on context.

Digital transformation can do much to support these values e.g. accessibility tools to make learning content usable by people with disabilities. However, it can also put them at risk. Market leading tools can have an increasingly direct influence on pedagogy and learning content. Student data may be gathered and used for business gain. Artificial intelligence (AI) relies on gathering the largest possible amount of data which is at odds with the principle of data minimization already discussed. Use of AI for 'adaptive learning' (i.e. the tool decides what content to present the student with next) can have benefits but can also result in loss of student autonomy.

4.2 Developing a strategy

The Dutch have identified that a joint approach across all stakeholders in the higher education sector is necessary to safeguard public values and influence the market. The approach needs to work across both education and research.

SURF has been charged with bringing together a permanent task force to develop and implement the joint strategy. The elements of the strategy are shown in the Figure 3.

Tangible outputs of the approach will include:

- Collective procurement negotiations based on agreed standards
- Collaborative development of critical infrastructure
- Open source alternatives to commercial offerings
- Innovative collaboration with the market
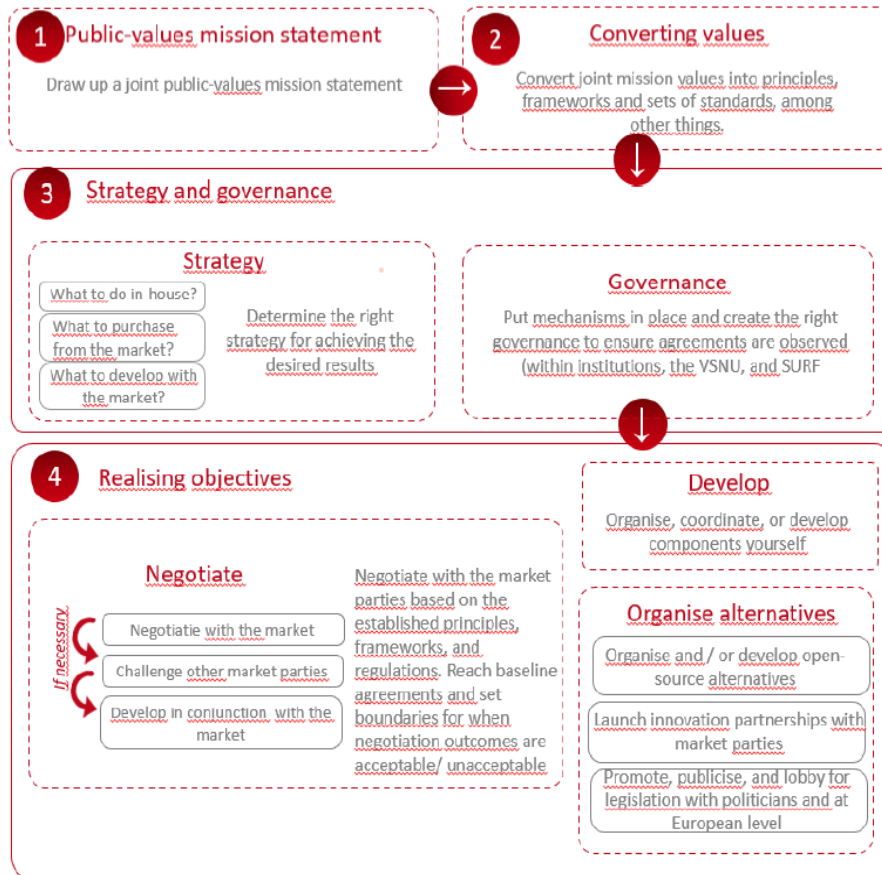- Lobbying for national or European legislation

Figure 3: Elements of the Dutch strategy to protect public values in education and research

4.3 Forming trustworthy private partnerships

As an example of innovative collaboration with the market, SURF is working with an edtech supplier, FeedbackFruits, to explore new types of public private innovation partnership that fit with the higher education sector's values.

FeedbackFruits emerged as a start-up out of TU Delft University and has managed to achieve hyper-growth as a bootstrapped (avoiding the need for external investment) scale-up operating in higher education worldwide. The company describes itself as '*Born at TU Delft but raised by SURF'*.

Central to the success of the relationship was SURF's insistence from the start that the supplier had to develop using open standards. As a start-up the FeedbackFruits developers weren't aware of the power of standards and they now see IMS standards as key to their own success and to enabling all edtech start-ups to scale up.

A successful public private collaboration method that FeedbackFruits has initiated has been the co-creation of new pedagogical tooling via the Edtech DoTank. A common issue, especially in the area of assessment and feedback, is that approaches known to be pedagogically sound are often not well served by software products commercially available. This can be a particular problem in Europe where products developed in the US may use different pedagogic approaches.

The Edtech DoTank is a co-creation initiative that brings education research from leading universities together with developers. Each year the partners identify education use cases not met by currently available technologies and work together to find solutions. The solutions are developed using open standards (mainly LTI) to be shared with all partners and seamlessly integrated into their learning and teaching toolkit.

Higher education institutions, FeedbackFruits and SURF are now drawing on their experiences of collaborative working over the last few years to draw up a 'trustworthy public-private framework'. The overall goal is to protect European and Public Values in the Public and Private collaborations that are part of the digitalization of our public education system. The goal of this project is to create a Trustworthy Public-Private framework (PPS) to inspire a new standard of collaboration between Dutch Edtech and Public institutions of (higher) education. The dream is to inspire EU legislation on trustworthy Public and Private collaborations to secure European Values in the digitalization of our education system, against private parties that 'lock-in' public institutions and enforce their own policies and agreements.

The thought behind this initiative is that the digitalization of our (higher) education system has the potential to disrupt the public values that our institutions are founded on. Currently the main Edtech players are US or China-based and may have a value framework different to European values. EU-based EdTech companies often require foreign investment to finance innovation and remain competitive, thus changing the shareholder structure, value framework and how the company operates. Since the rapid digitalization of our public education systems requires long-term trustworthy private partners, securing the long-term trustworthiness of EdTech players is of significant strategic importance to public education and thereby to society.

The initiative is also an attempt to show institutions of higher education the private perspective and gain an understanding of how start-ups develop and grow. If higher education wants trustworthy private partners for the long term, then the attitude towards 'good EdTech' needs help shape these companies and develop the right moral compass, go-to-market strategy and common competitive field that drives innovation.

5 Conclusion and call to action

All the stakeholders in the EUNIS community have a role to play in developing the desired ecosystem and ensuring that as many of our operations as possible exist as fully compliant and interoperable elements of a secure, trustworthy and accessible ecosystem. Following on from that, the only solution is collaboration: as universities, as countries, and, preferably, as Europe. Europe has shown its strength in collaboration and joint agreements. The GDPR has a direct and global impact on market parties and the European education sector has shown its strength, for example with the Bologna Declaration. Below are a number of actions for EUNIS, NRENs, universities and suppliers although the list is by no means exhaustive.

5.1 EUNIS Board

EUNIS board has the following role to play at the strategic level in its engagement with senior higher education leaders, with IMS 1EdTech and with the European Commission.
- Make public values a focus of its engagement with all stakeholders.
- Communicate the importance of open standards and secure and data privacy compliant APIs to institutions and to the commission.
- Communicate the importance of open standards and secure and data privacy compliant APIs to its corporate members.
- Make recommendations about which standards should be used in transnational initiatives.

- Keep the IMS 1EdTech community informed about major European initiatives and the standards implications.
- Encourage its members to play an active part in IMS 1EdTech standards development in order to ensure national differences are understood and accounted for.

5.2 NRENs

NRENs have a critical role to play both in terms of developing national infrastructure and in providing advice and guidance to member institutions.

- Make recommendations about which open standards should be used in national initiatives.
- Play an active part in IMS 1EdTech standards development in order to ensure national differences are understood and accounted for.
- Work with the IMS 1EdTech community to align any national standards to global equivalents through either a roadmap for convergence or a national profile of the global standard.
- Issue advice and guidance about standards, interoperability, accessibility, security and data privacy to the user community.
- Require standards compliance in your own procurement and encourage institutions to do the same.
- Communicate with suppliers, especially start-ups and scale ups, about the importance of standards as a means of supporting your public values.
- Maintain a dialogue with suppliers about issues they have with regard to standards, also in relation to cooperation with institution regarding EdTech.

5.3 Universities

There are a wide variety of EUNIS member stakeholders within any single institution and the recommendation here is to engage with the topic at the level that is relevant to your role.

- Understand and use relevant standards in the architectural design for the IT application and infrastructure landscape.
- Understand the relevance of standards to any procurement decisions for which you are responsible/involved.
- Understand the relevance of standards to any partnership initiatives with which you are involved e.g. European Universities initiative.
- Require relevant standards compliance from all of your suppliers.
- Consider participating in the IMS 1EdTech community to ensure your use cases are met and to influence future developments.

5.4 Suppliers

The EdTech supplier landscape in Europe is very varied and consists of large global suppliers, start-ups, scale ups and open-source communities. Global suppliers have a need to ensure that their products work across borders so smaller, more niche suppliers can benefit from the development effort already expended to create and develop standards. These recommendations are geared towards Europe-based suppliers but are equally applicable to all.

- Understand which standards are important for the interoperability of your product and ensure your product is certified as compliant with the latest version/s.
- Play an active role in 'maintaining the health' of the ecosystem by ensuring that your partners achieve compliance as a pre-requisite for doing business with you.
- Talk to institutions about the importance and added value of using open standards.

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