A Network Code for Demand-Side Flexibility

smartEn Position Paper on the joint TSO-DSO roadmap report

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INTRODUCTION

The EU has committed itself to an ambitious agenda both through the Clean Energy Package and the EU Green Deal. With ambitious CO2 reduction targets, the importance of variable renewable energy sources (RES) continues to grow, combined with the need to increase the smart electrification of transport, buildings and industry. As indicated by the European Commission, decarbonisation and decentralisation increase the system's need for flexibility. This is especially true for demand-side flexibility (DSF), which is urgently needed to make the energy transition possible and cost efficient. This has already been acknowledged in the Clean Energy Package, which sets out crucial principles for a harmonised European electricity market. We welcome that the implementation of the Electricity Market Design Directive and Regulation remains a priority for the European Commission and European TSOs and DSOs, as they already contain valuable provisions to eliminate regulatory barriers to demand-side flexibility. Among others, the framework for the participation of demand response, including through aggregation, to all electricity markets, as well the principles of market-based congestion management, local energy communities and non-wire alternatives to grid extension, set ambitious measures for the inclusion of new actors to the markets.

To take full advantage of all the benefits that market-based DSF can provide today, and to complement the provisions set by the Electricity Market Design, a legally binding technical framework is urgently necessary. One of the main barriers to scaling up DSF is that despite the Commission's best efforts towards a true Energy Union, the market for DSF is still fragmented, and almost non-existent at local level. For this reason, smartEn supports the creation of a network code for Demand-Side Flexibility where all these barriers are addressed in a timely fashion.

This position paper aims to provide smartEn's position and recommendations on the DSF Network Code, based on the report titled "Roadmap on the Evolution of the Regulatory Framework for Distributed Flexibility" published by the Joint Task Force (JTF) composed of ENTSO-E and the four European associations representing DSOs (CEDEC, E.DSO, Eurelectric, GEODE). This report analyses the regulatory requirements to integrate Distributed Energy Resources (DERs) into the grid and system services both at transmission and distribution level. This position paper is best read in parallel with the JTF report. Following the structure of the JTF report, it is also divided into four clusters, focused on select topics in relation to:

- Market access and rules for aggregation
- Product design and procurement
- Market processes and transmission and distribution (T&D) coordination
- Measurement, validation and settlement of flexibility services

TOPICS

Market Access and Rules for Aggregation

Topic 2: Does the EU framework provide standardised requirements to ensure market parties have access to necessary information from system operators on their needs for the services in this analysis?

Description: This topic addresses the standardised functional requirements to ensure market parties have access to necessary information from system operators. The JTF proposes bidirectional information sharing, with market parties providing information on accurate schedules. Topics that may be covered through this standardisation process include prequalification requirements, product definitions of flex services, and select data sets for better congestion management and balancing operation. The JTF is concerned with the possibility of gaming if too much information is shared with market parties and acknowledges that most of the existing legislation on this matter focuses on the transmission level.

SUPPORT the creation of standards and guidelines for certain data sets, including:

- Congestion information:
  - Geographical scope (up to feeder level) of congested area
  - Historical and forecast data
  - Required services by the SO
- Prequalification requirements
- Flexibility product definitions
- Data on the energy mix and GHG content at least at hourly basis or at the settlement period
- Other information required by market parties or SOs

This information should be shared with all market participants in an interoperable manner, with harmonised open data formats. Data formats need to evolve to accommodate the specificities of DSF. In this regard we recommend leveraging IEC62325 and the work that ETSI-CEN-CENELEC is doing on smart grids standards. It can be then used to provide the appropriate signals to the end consumer as well as to facilitate aggregator activity by providing information on the geographical areas, feeders, or grid-tie points with highest potential and streamlining the prequalification process across the EU.

IMPROVE by including a clear definition of what type of legislation should address the standards (i.e., a new network code, amendment of existing ones, or both).

OPPOSE the inclusion of the risk of gaming as a means to stop implementation of standards and guidelines for information sharing that will facilitate the development of flexibility. Gaming should be dealt with through other means, especially market surveillance, which is a duty of NRAs as already addressed by relevant regulation (in particular REMIT), especially since it could still occur regardless of whether the information is shared.

Topic 3: Does the EU framework address the concept of flexibility resources register and related functionalities?

Description: The Flexibility Resources Register proposed by the TSO-DSO TF includes all the significant data/information about the resources/assets which seek participation in flexibility services, including aggregators and associated assets.

The proposal suggests the following high-level groups of information:

- Identification information
- Prequalification information
- Deliverable flexibility
- Contractual information for relevant parties
- Settlement-related information

IMPROVE the proposal to justify appropriately why the data in each of the five categories is required by the TSO/DSO in the flexibility register. Reasoned justification is indispensable, because resource or asset providing a service should not be indispensable information, but rather the commitment to deliver a service and the services that can be delivered at a particular grid-tie point, independent of what assets are behind it. For more information, please refer to the "Asset class vs. Service based approach for system services" position paper by smartEn[1].
Concerns that should be addressed:

- The move towards an asset class approach instead of a service-based approach, in a reality where power electronics and digital solutions allow pools to take the desired product-shape, independent of the pooled technologies.
- The FRR could constrain and limit innovation or could be used as a kill-switch for flexibility resources
- Avoiding unnecessary bureaucracy for smaller DERs by requiring mandatory registration of individual assets in instances where the pool is more efficient
- Protecting competition by avoiding sharing of sensitive data, especially in markets that have not fully unbundled
- Preserve a service-based approach where only capabilities that can be delivered are registered, not how and what assets/resources deliver them.

If such a register were to be implemented, it should facilitate a bidirectional flow of information between SOs and market parties. A blanket approach to individual registration of each asset could be cumbersome, overly expensive, and defeat the purpose of a service-based approach where the pool management is more important than the actual assets providing the service. As a rule, visibility of the aggregated portfolio should be the standard. But where local disaggregated data is sought, DSOs should justify the need to register and back it up with a clear intention to procure system services for that specific area.

The shape and size of geographical areas for which disaggregated data is necessary should also be justified and overseen by the NRA. Providing disaggregated registration could put aggregators at a disadvantage, if specific needs for local congestion management are not justified.

[1] https://smarten.eu/wp-content/uploads/2021/07/smartEn-Position-Paper-Asset-vs-Services-FINAL.pdf

Individual registration of assets should be applied on a voluntary basis, such as for instance where a consumer decides to register its resources for visibility reasons to the SO.

Importantly, any registry created should be designed in a way that guarantees data safety, one possibility could be assigning each pool of assets a decentralised identification (DID); see for example registries established in California and Australia in collaboration with the Energy Web Foundation (Energy Web Switchboard).

Finally, a mandatory flexibility register could be redundant if a parallel technical pre-qualification is still required. If the flexibility register is created, it should also serve as an automatic prequalification method. Alternatively, it could be used to facilitate and streamline further prequalification processes, include a minimum set of requirements for the prequalification process, and include data of market participants and relevant information on their pools.

Topic 4: How can Flexibility Service Providers (FSPs) access multiple revenue streams for their assets and stack value across different markets?

Description: The JTF acknowledges the potential and right for service providers to stack different services to maximise their business potential and make the best use of the available flexibility. For this to happen, market access rules need to be adapted both at TSO and DSO level. The areas that need improvement include data visibility, minimising exclusivity in certain markets, making contracts compatible, and developing international standards for use between market parties and system operators.

SUPPORT the JTF proposal to include market access rules to allow for stacking of services in a new network code. Amendment of existing regulation would risk restriction to transmission level products.

IMPROVE the proposal by including sharing of network visibility for market parties to properly assess which markets show potential for locational and time reasons to bid in simultaneously. It should also streamline IT and communication systems requirements: these should be compatible for most system services and not require additional investments by the service provider. Exceptions can be implemented for specific products like fast frequency measurement, that would require highly detailed frequency measurement that is not necessary for other products.

IMPROVE: The role of local energy markets (energy communities with active peer-to-peer and community trading) and dynamic grid pricing should be explored more ambitiously to support provision of flexibility congestion management.

Topic 5: Does the current EU framework address the role of flexibility market operator (FMO) and how it interacts with other entities?

Description: The JTF proposes the creation of a flexibility market operator to deal with intra-zonal congestion management and market-based redispatch. They do not indicate whether this role should be provided by a regulated or commercial entity. The current EU framework does not address the role of the flexibility market operator, but based on the roles of the balancing and wholesale market operators, the JTF could see a similar role development.
However, the JTF advises against establishing new roles, instead recommending waiting for further development, to avoid further complication of rules.

SUPPORT the JTF proposal to not implement additional regulation for the new role of an FMO at the moment. The introduction of a third actor between the SOs and market parties could limit innovation and slow down the growth of flexibility services.

IMPROVE the proposal by recognising that the role of the FMO exists but avoid a detailed regulation that stifled innovation. The role as flexibility market operator should sit within the competitive domain, as opposed to the regulated domain, to facilitate addressing the needs of all market participants.

Product Design and Procurement

The JTF includes three products in their assessment: grid capacity management, congestion management and voltage control. Product design should be made at national level, and they suggest the creation of an attribute list from which all Member States can choose. Please refer to the JTF report for a detailed list of attributes.

Topic 6: Common list of attributes for flexibility products (congestion management, grid capacity management, voltage control)

In addition to the attributes suggested in the JTF report, we propose adding:

- Minimal recovery time
- Maximum number of activations per time period
- Metering requirements
- Delivery validation method
- Baseline methodologies allowed
- Remunerations and penalties

Topic 7: Product prequalification

Description: The JTF acknowledges that product prequalification can impose a significant barrier for market participants and that further streamlining and standardisation is required to have similar rules across Europe. However, they want to maintain the right to impose additional local technical requirements to ensure system security. In addition, they propose that registration of market parties in the flexibility register should be mandatory (in parallel to the prequalification).

SUPPORT the effort to streamline and standardise prequalification. Prequalification can be dealt with in different network codes (e.g., in the EB GL) but it could be necessary to include the same standards in a new network code for DSO products.

IMPROVE the proposal by including prequalification standards at EU level rather than at Member State level. Different prequalification processes can increase the costs and impose barriers for market parties that want to operate in multiple EU countries. Prequalification should be done once and be valid in different countries (similar to licences for commercial goods). The proposal of the JTF follows a siloed approach when dealing with the prequalification process: prequalification based on each asset, grid level and service to be provided, and for each country. smartEn suggests a single harmonised prequalification process that is valid for different technologies and aggregated pools, and that allows them to sell their flexibility in various markets and to different buyers (that might or might not be SOs). Alternatively, if local specificities make it so that a common prequalification process is not viable, at least a list of common principles for prequalification should be shared across the EU. Any deviation at Member State level of the common principles should be properly documented to reduce the country-specific integration efforts.

OPPOSE the national scope of the proposal. National prequalification design will bring the same problems that are supposed to be overcome in this topic. At a minimum, common principles for prequalification should be shared across the EU.

Topic 8: (static or long term) Grid prequalification for congestion management

Description: Grid prequalification is intended to check whether the grid can accept the delivery of the product and/or whether the telemetry and measurement requirements are met. "Static grid prequalification" grants conditional grid access for flexibility resources according to criteria clearly specified in advance. Such conditional grid access would be reviewed later in the "dynamic" or "short-term" grid prequalification. The JTF proposes that prequalification requirements should be designed at national level to consider specificities of congestion management.

IMPROVE the proposal to have static and dynamic grid prequalification processes that follow the same standards and procedures as presented in Topic 7, with EU harmonisation of at least a list of common principles for prequalification. Any deviation at Member State level of the common principles should be properly documented to reduce the country-specific integration efforts.
IMPROVE the proposal by making sure that all resources have access to all markets and that grid prequalification for congestion management is not used as a way of preventing access to certain markets. Any activation that would create congestion could be curtailed, under the condition of a compensation for the loss of opportunity.

Topic 9: Telemetry requirements for measurement, validation and settlement purposes for flexibility services

Description: The assets delivering flexibility services should provide the required data at the right time interval, depending on the product definition. This information could be collected from the main meter or other devices. Telemetry requirements are part of the product design and prequalification process. According to the JTF, the main meter

is the only one that guarantees the actual measurement of the energy/capacity requested from the grid or injected to the grid. Therefore the main meter is the one that can be used for the system observability and the imbalance settlement. This topic is in conflict with topic 20, since there the need to define requirements and access to sub-meter data appears indispensable for SO's management. TSOs and DSOs have diverging opinions.

SUPPORT the DSO position to further define telemetry requirements for congestion products at local level. However, these should follow the same guidelines as for other products.

IMPROVE by aligning topics 9 and 20. One says that the main meter data is the only relevant data, while the other says that sub-meter data is also required for accurate measurements. Use of sub-meter data should be on a voluntary basis (and with customer consent) in cases where detailed information would be better for baselining and settlement. Where appropriate, sub-metering can provide many benefits and advance innovation and local energy trading and sharing, and should be used on a product basis, where deemed necessary after appropriate justification.

IMPROVE the geographic scope for EU-wide telemetry requirements, to avoid having to adapt hardware in each country and to avoid unnecessary, expensive and unjustified telemetry requirements.

IMPROVE the prequalification proposal by including harmonised telemetry requirements for measurement, validation and settlement as part of the prequalification process, following the same principles as in topic 7:

- Harmonised principles
- Avoiding fragmentation of markets
- Reducing requirements to the minimum absolutely necessary for sufficiently accurate delivery and measurement,
- Specify the requirements on what sub-metered data is sufficient and clarify sub-meter ownership and placement, i.e:
    - Sub-meters can be provided by the manufacturer and be included in the device
    - Range of sub-metering allowed: Measuring Instrument Directive (MID) certified meters, simple active AC electrical energy meters
    - Certification level of sub-metering: Harmonised certification method that follow the MID, to avoid individual MS implementing additional certification requirements.

OPPOSE the JTF statement that the main meter is the only one that guarantees the actual measurement of the energy/capacity requested from the grid or injected to the grid. Subject to appropriate safeguards, sub-meters should be allowed on a voluntary basis or depending on specific products, for the delivery of any product, including local congestion management.

Market Processes & T&D Coordination

Topic 12: Flexible services from aggregates: availability of disaggregated data

Description: The JTF argues that TSOs and DSOs shall be able to request from aggregators all the necessary data from single resources within the aggregate to safely perform their grid prequalification and grid assessment. They propose these requirements to be enshrined in EU regulation, while also allowing variations between countries based on the needs of SOs.

IMPROVE the proposal by extending the data requirements to be defined at EU level, rather than national level as proposed by the JTF.
IMPROVE by respecting principles of proportionality and efficiency on which data sets are shared and for which purposes, to avoid creating unnecessary requirements and unmanageable datasets. Sharing of disaggregated data by market parties should be linked to the existence of a market that requires such level of disaggregation and not as a general rule.

OPPOSE the pre-emptive suggestion that SOs might use "wide conservative margins" of information requested from aggregators if the information they want is not provided. The need for that level of granularity and amount of data is not appropriately justified and could lead to costly processes for aggregators as well as SOs. The provision of data to such level of detail is not fully justified, and not clear that it will be usable by the SOs. In most cases the provision of aggregated data at pool level should be sufficient, together with the service provider's contractual agreement to deliver the contracted amounts. For cases of local congestion and only for qualification, the SO might require information on the pools in the specific congestion area that could fulfil the SO's congestion management needs. The specific congestion area should be clearly justified to avoid arbitrarily small areas.

OPPOSE the mandatory requirement for visibility of individual units providing services at any level. This type of control could be used to curtail flexibility sources if desired by the SO. Management of flexibility pools should be the responsibility of the service provider. Disaggregated visibility of assets should only be required in case of a specific local need and if there is a concrete proposal for a local market that requires that visibility. The end user should be informed about how their data is used and consent to different purposes, and the roles and responsibilities in ensuring data security and privacy should be clear (see also Topic 16).

Topic 13: Coordination between market processes for market accessibility and efficiency

Description: The JTF proposes coordination between market processes and functions before activation to make the best use of flexibility at every level. This would require an integrated system approach between all market participants and the development of interoperability between market processes with the goal to reduce fragmentation. This is not currently covered by any legislation. The proposal lists a series of principles that should be harmonised to facilitate market coordination (page 59 of JTF report).

SUPPORT the proposal to facilitate market coordination and bidding into different markets for flexibility providers. The framework should be at EU level as proposed by the JTF.

IMPROVE the proposal with a clear description of the coordination process and a list of responsibilities of each party.

IMPROVE the proposal by including:

- Stacking of services: FSPs should be allowed to participate in different markets with the same flexibility resources through the same or different services if these services do not conflict with each other.
- Implicit DR: To allow flexibility providers to take advantage of all possible services, it should be possible to combine implicit DR with explicit grid management processes.
- Cascading bids: The flexibility procurement mechanisms should be designed so that the FSP has the possibility to reoffer services of pre-contracted capacity to other parties if the DSF was not selected in prior market processes.
- Increased locational transparency: Include locational information in flexibility requests.
- Price formation defined clearly and separately for each market process.

Topic 16: Framework for flexibility service providers (FSP)

TSOs and DSOs have two different positions on this topic.

- TSOs argue that the Electricity Directive gives Member States freedom to create a framework for FSPs and that the SOGL, KORRR and EBGL already cover the necessary data exchange and security provisions that would be covered by new legislation. They reference the EG3 report and ASM report as "common understandings" between TSOs and DSOs. They see the priority of this topic as low.
- DSOs argue that the existing legislation is insufficient and only provides principles, in particular at distribution level. They support the call for action in the EG3 and ASM reports and acknowledge that these are not legally binding documents, and that their requests should be included in a new EU-wide Harmonised Role Model (HRM)

SUPPORT the DSO position: the existing legislation has been insufficient in defining aggregator frameworks across the EU with clear division of rights and responsibilities, especially with regards to data security and data sharing.

IMPROVE by including both TSOs and DSOs in the creation of this HRM, as it should be applicable both at distribution and transmission level to avoid fragmentation within a Member State.

Topic 17: Use of flexibility resources register for the T&D coordination purposes

The flexibility register is presented as a concept (not an IT implementation), to be unified across the EU, but with practical implementation left up to individual Member States. Both TSOs and DSOs agree on developing this concept in EU legislation. According to the JTF, the flexibility register should:

- Ensure joint knowledge and visibility of all resources participating in flexibility markets
- Identify providers that might cause or solve constraints
- Provide real-time status information of the assets
- Provide information on the allocation of volumes

To avoid individual Member States implementing different solutions SUPPORT the inclusion of the concept of a flexibility resources register in a Network Code, taking into account the caveats presented in topic 3, in particular the need to put the services that can be provided at grid-tie point in the forefront to avoid a move towards an asset-based approach.

IMPROVE the proposal of the flexibility register. It should not be a tool to control and curtail different flexible loads. Aggregators should be able to manage their pool of behind-the-meter assets as they see fit, and individual asset observability by system operators should not be required by default, but allowed based on the explicit consent of the end user. For smaller resources, visibility of the aggregated resources across the defined local congestion area should be sufficient to address DSO congestion management needs. The register can be a tool to facilitate and homogenise the prequalification process across the EU and at different network levels.
As this role would be different from a real-time system management tool, if the FRR is used for redispatch or to constrain asset dispatch, this should be done only as a request proportionate to the congestion observed in a zone or area, and always subject to a fair compensation. The need for and specifications of real-time status information should be clearly justified by the SO for each service, otherwise it should not be necessary to provide this information.

Measurement, Validation and Settlement

Topic 19: Main meter data exchanges for distributed flexibility

Description: The JTF proposes a harmonisation of a series of data exchanges required by TSOs and DSOs for availability control, product and grid prequalification, activation control and settlement purposes. They acknowledge that most of the access and sharing of data will be dealt by the implementing act on data access and interoperability. However, some additional legislative work might be required for near real-time non-validated measurements for settlement and observability purposes. Both parties see this as a high priority.

SUPPORT the approach to deal with data and interoperability in the appropriate implementing act.

IMPROVE by ensuring that the same and relevant data sets are shared, with customer consent, with independent aggregators and other ESCOs that might use this data for

operation of the customer's assets. Alternatively, again with customer consent, this data can be used to assess their potential as new customers by a third party. The previously suggested energy asset registry could be used in this case while protecting privacy.

IMPROVE by expanding interoperability needs to cover all sub metering and measurement related to key processes such as grid observability and settlement. The distributed nature of DERs will furthermore require further harmonisation of data interfaces using standards from ETSI-CEN-CENELEC (with proper conformance testing for devices).

Topic 20: Free flow of sub-meter data

Description: A EU-wide harmonised rule-set for the sharing of sub-meter data (for TSO/DSO processes like settlement, baselining, real-time monitoring, forecasting, planning, prequalification data). This should be harmonised at EU level to avoid market fragmentation and increasing costs for aggregators due to different approaches to measurement devices, telemetry, aggregation software and integration. This data should be available to all relevant market parties (based on customer consent). The JTF suggest this is dealt by the implementing act on data interoperability.

SUPPORT the inclusion of this topic in the implementing act for interoperability of demand-response data.

IMPROVE the text making sure that consumer consent is always appropriately obtained and the sharing of sub-meter data is only used on a voluntary basis for purposes of accurate settlement, and not imposed by the SO. System Operators should be allowed to audit individual data to check accurate measurement of flex services, but not ex ante.

Topic 21: Settlement and observability based on sub-meter data

For system security and control, the JTF agree on technical specifications of sub-meter data and access to this data. The main reasons to use sub-meter data, rather than just the main meter data are to allow more accurate measurement of short activations, to verify delivery from specific assets and to facilitate baseline calculation. They suggest that network codes should be adapted to cover sub-meter data requirements and include rights for SOs to access that data (beyond observability as the SOGL states).

IMPROVE by ensuring that the use of specified data is confined to very specific activities. Ensure that no additional costs are born by the sub-meter operator. Use of sub-meter data should be subject to consumer consent and on a voluntary basis to facilitate settlement and baselining, and not imposed by the SO. Use of sub-meter data for validation and settlement should be carefully framed to avoid any fraudulent behaviour (e.g, moving loads from one behind-the-meter asset to another to simulate activation) which would deter confidence in the use of market flexibilities by SOs. A stepwise implementation of sub-metering, and cross-checks of the sub-metered data with the main meter data to detect such behaviours, are advisable.

Topic 22: Harmonised principles for baselining

The JTF understands the need for harmonised principles for baselining, and in fact uses smartEn's and EG3's proposal as a starting point for the parameters that should be considered for harmonisation. However, while Article 15 of the Regulation sets a mandate to use baselining in settlement of demand response providers, it does not define with what methodology, or under which rules, this baseline should be determined. Because of this, the JTF recommends the definition of baseline principles to be accepted by individual Member States, and to establish a general recommendation in the NC for TSO-DSO cooperation to create a catalogue of best practices. The JTF acknowledges that baselining is an adequate tool to avoid gaming.

SUPPORT the JTF vision of the need and benefits of harmonised principles for baselining.

IMPROVE by suggesting an explicit inclusion in the NC of principles and parameters to consider in the baselining design across the EU (beyond the proposed more general requirement for TSO-DSO cooperation). Baselining methodologies should be consistent with the sub-metering data available. They should also consider the interaction of implicit DR with explicit DR and be consistent across TSOs and DSOs.

Topic 23: Harmonised rules for coordinated settlement

The JTF proposes a set of rules to facilitate value stacking though coordinated settlement to better measure flexibility quantification and costs. The EB GL already requires TSOs to develop a procedure for the calculation of balancing energy, but does not go into detail regarding coordination with other parties. The JTF proposes rules for settlement of flexibility being used by more than one operator, for splitting the bill in cases of more expensive bids being activated and a CBA for coordinated settlement (to consider assets that might not want to participate in various products at the same time).

SUPPORT the proposal of coordinated settlement to facilitate value stacking and selling services to various operators.

IMPROVE by specifying legislation for coordinating settlement. The JTF may expect this to occur in amendments to the EB GL (as this currently only impacts balancing, frequency restoration and replacement reserves).

Additional topic: Network planning

To fully implement the previous topics DSF needs to be fully included as any other technology in the short- and long-term network planning. A number of considerations should be included and answered in the DSF network code:

- What peak demand should system operators use as a reference for grid planning?
- Quantify the flexibility availability for local grid planning.
- Require a reasoned justification and a cost-benefit analysis for all wire investments and compare them to the equivalent non-wire alternatives.

- Include clear transparency requirements from SOs in their grid planning, disclosing network constraints.

About smartEn – Smart Energy Europe

smartEn is the European business association integrating the consumer-driven solutions of the clean energy transition. We create opportunities for every company, building and car to support an increasingly renewable energy system. Our membership consists of the following companies:

The positions expressed in this document represent the views of smartEn as an association, but not necessarily the opinion of each specific smartEn member.
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