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## The effects of the COVID-19 pandemic on the compilation of consumer price indices

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A consumer price index (CPI) is the official indicator providing timely information on inflation in an economy.

A straightforward way to understand the nature of a CPI is to imagine the average household shopping basket, containing all the goods and services needed for a month. Individual prices vary from month to month, and the CPI measures this change, which is what we call inflation.

In the health emergency resulting from the coronavirus disease (COVID-19) pandemic, calculating the CPI is challenging for national statistical offices (NSOs) because they are prevented from carrying out the usual price collection procedures.

This article presents the different measures that have been taken by NSOs responsible for compiling their country's CPI and the effects of these measures on price collection, with a view to improving price estimation while the health emergency continues.

## The characteristics of the survey conducted among national CPI technical teams in the Latin America and Caribbean region

The COVID-19 pandemic has posed a major challenge to the continuity of statistical operations. In response, the Statistics Division of the Economic Commission for Latin America and the Caribbean (ECLAC) has carried out two surveys of the institutions responsible for compiling the CPIs in the region's countries<sup>1</sup> to identify the issues faced and the responses implemented.

The first survey was conducted in March 2020,<sup>2</sup> as this was the month when most countries in the region adopted lockdown measures. The survey focused on identifying the initial CPI measurement situation in the context of the pandemic.

The second survey was conducted in late April 2020 and answered by 22 countries (see table 1), all in the Latin America and Caribbean region.<sup>3</sup> Its objective was to learn about the measures taken by NSOs to compile the CPI and the effects of these measures on the price collection process. The present article presents the results of this second survey.

### » Table 1. Countries participating in the second survey

Antigua and Barbuda	Brazil	Dominican Republic	Guatemala	Paraguay
Argentina	Chile	Ecuador	Honduras	Peru
Belize	Colombia	El Salvador	Mexico	
Bermuda	Costa Rica	France	Nicaragua	
Bolivia (Plurinational State of)	Cuba	Grenada	Panama	

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

The survey comprised four sections, the first three of which asked about quantitative indicators regarding the proportion of imputed prices, new price collection procedures implemented and how technical staff perceived their application. The last section enquired into the operational measures taken to implement the new price collection procedures.

The rate of prices requiring imputation was identified as a comparable measure (see box 1). Lockdowns and restrictions affect the price collection process, so the rate of missing prices that have to be imputed is a sensitive measure.

<sup>1</sup> The Statistics Division of ECLAC has carried out a number of activities aimed at the NSOs and central banks of Latin America and the Caribbean to support the countries' statistical operations in the face of the health emergency (see <https://rtc-cea.cepal.org/en>).

<sup>2</sup> This survey was answered by 18 countries.

<sup>3</sup> Except France.

## » Box 1. Technical note on the imputation rate

The imputation rate is one of the CPI quality indicators. The imputation rate is the proportion of prices that will have to be estimated using the methodologies established by the technical staff in each country, following international recommendations. To determine the imputation rate, the size of the target sample for each of the basic items in the basket must be known:

Percentage of prices imputed for

$$[i] = \frac{\text{Number of unobserved prices } [i]}{\text{Number of prices in the target sample } [i]} \times 100$$

Where  $i$  is the item being investigated.

The target sample should be representative and provide maximum coverage of the geographical area encompassed by the CPI. One of the main goals when collecting prices in the target sample is that, if possible, the proportion of imputed prices should not exceed 5%, or in some cases 7%. A proportion in excess of 10% means that the price sample or the specifications of the products in the basket need to be revised.

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Countries usually calculate the imputation rate to determine monthly collection coverage. The treatment of unobserved prices should follow imputation procedures set out in CPI methodological manuals, which are implemented and disseminated by NSOs in each country.

CPIs provide for imputation rate ranges that usually do not exceed 7% of observed prices, although they may go somewhat higher at certain periods of the year owing to the behaviour of seasonal products, e.g. fruit and vegetables, school supplies, etc.

The results, which were obtained thanks to the active participation of the countries' technical staff and their NSOs, are presented below.

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## Results

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The following sections present the results obtained in the form of charts and their analyses.

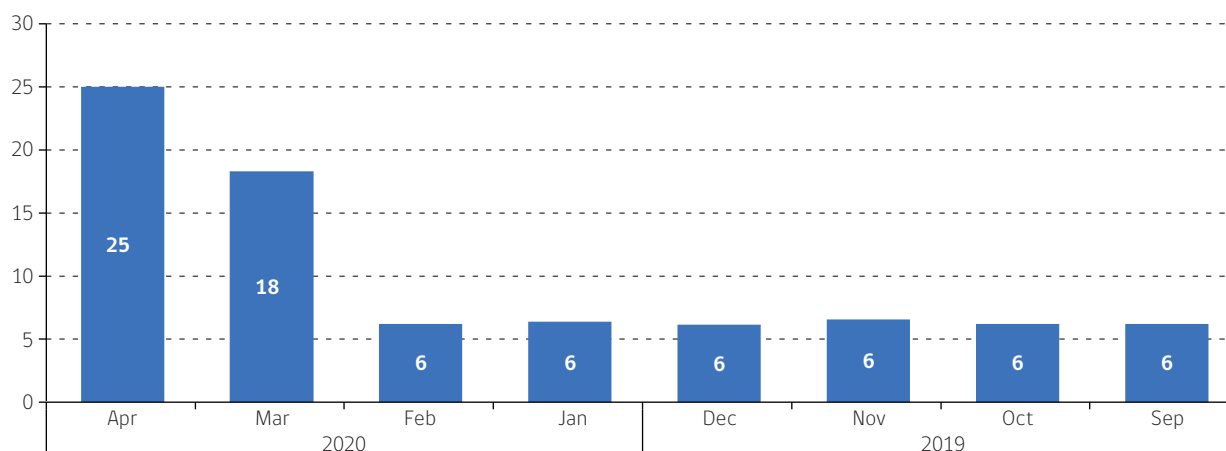
### The behaviour of the imputation rate

The questions about imputation rates focused on identifying patterns in the six months prior to the declaration of the health emergency in the countries of the region (September 2019 to February 2020) and the months of March and April 2020, when most of the countries in the region had introduced movement restrictions.

Figure 1 shows the behaviour of imputation rates in the region. On average, the period prior to lockdown evinces normal behaviour unaffected by COVID-19. For this period, the average monthly imputation rate is around 6%.

» **Figure 1. Average price imputation rates in Latin America and the Caribbean, by month<sup>a</sup>**

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of a survey conducted among national institutions responsible for producing the consumer price index (CPI) in Latin America and the Caribbean.

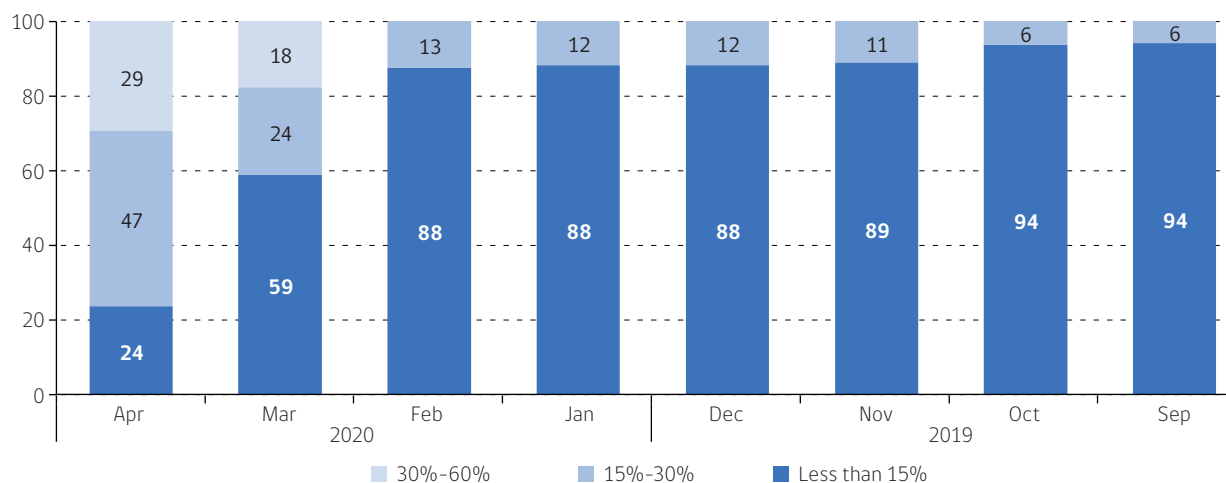
<sup>a</sup> Based-on responses from the 19 countries participating in the survey.

For the months of March and April 2020, affected as they were by the health emergency, the imputation rates are more than three times the levels of the previous months, at 18% and 25%, respectively. As can be seen, the increase in the imputation rate was smaller between March and April 2020 (7 percentage points) than between February and March 2020 (12 percentage points).

Figure 2 presents a breakdown using ranges of imputation percentages and the number of countries in each of these ranges, with four levels: (a) less than 15%, (b) between 15% and 30%, (c) between 30% and 60%, and (d) above 60%. This last interval is not shown in the chart as the level of imputation was not that high in any of the countries.

» **Figure 2. Latin America and the Caribbean (19 countries): countries in each imputation band<sup>a</sup>**

(Percentages of countries)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of a survey conducted among national institutions responsible for producing the consumer price index (CPI) in Latin America and the Caribbean.

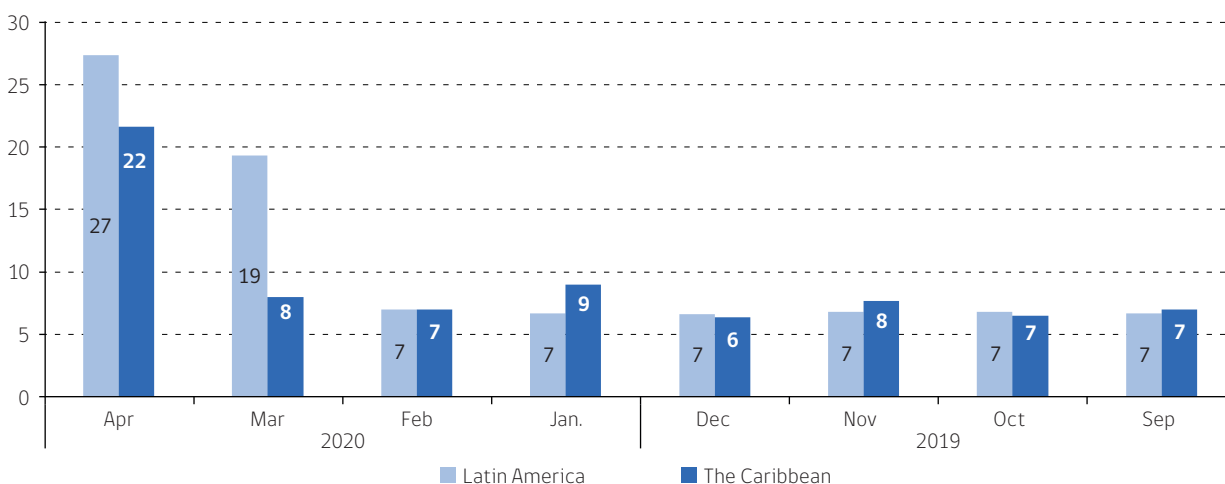
<sup>a</sup> Based-on responses from the 19 countries participating in the survey.

Between September 2019 and February 2020, most participating countries (88%) reported imputation rates below 15%, while the remaining 12% reported rates in the 15% to 30% range. By March 2020, the proportion of countries in the lower imputation bracket had decreased to 59%, while 24% of the countries now reported imputation rates in the 15% to 30% range, an 11-percentage-point rise on the previous month's 13%. That same month, 18% of the countries reported imputation rates in the 30% to 60% range.

For April 2020, mobility restrictions resulted in greatly altered shares, as follows: the proportion of countries with price imputation rates below 15% was only 24% (35 percentage points lower than the previous month); the proportion of countries with imputation rates in the 15% to 30% range was 47% (17 percentage points up on the previous month); and, lastly, 29% of participating countries had imputation rates in the 30% to 60% range, a rise of 11 percentage points on the previous month.

In the Caribbean subregion, the imputation rate observed between September 2019 and April 2020 suggests that the health emergency began somewhat later there than in Latin America:<sup>4</sup> the rate was unchanged in March from the patterns observed since September 2019, while in April it jumped to 22%, 14 points higher than in March. Figure 3 shows the differences by subregion.

» **Figure 3. Latin America and the Caribbean: average imputation rates by subregion<sup>a</sup>**  
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of a survey conducted among national institutions responsible for producing the consumer price index (CPI) in Latin America and the Caribbean.

<sup>a</sup> Based on responses from the 19 countries participating in the survey.

For the Latin America subregion, the imputation rate already showed a trend shift in March 2020, with a rise to 19% (12 points up on the average for September 2019–February 2020). In April 2020, the imputation rate in Latin America rose further, to 27%, once again representing a 12-point increase on the previous month.

Meanwhile, the imputation rate showed greater variability for the Caribbean countries than for the Latin American countries between September 2019 and February 2020. This could be because imputation rates in the Caribbean have not been calculated using procedures to optimize informant sample sizes and distributions, as has been done for Latin America.

<sup>4</sup> The ECLAC survey was conducted in April 2020. A number of countries continued to apply mobility restrictions after this exercise, and some were still doing so in early 2021, at the time of writing.

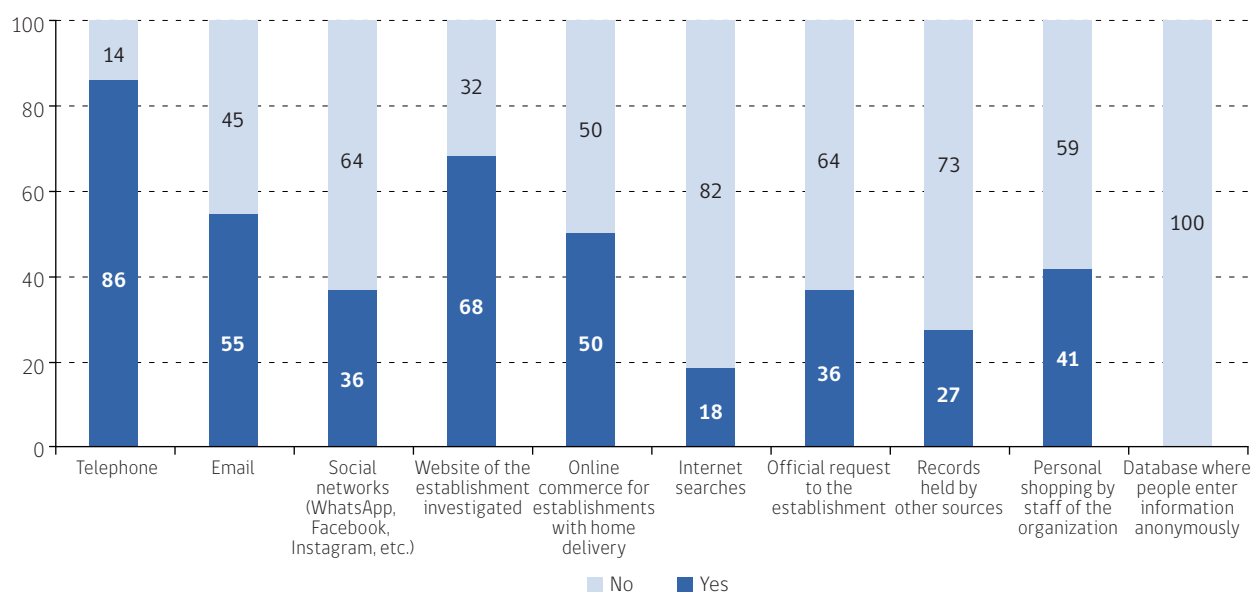
## Collection methods

In response to lockdown measures, NSOs in charge of the CPI had to adopt new data collection methods to replace or supplement on-site collection. It transpired that the countries' experience in this area prior to the pandemic was limited or non-existent, as these methods, which are considered innovative, do not guarantee some factors that enhance on-site collection of information on the prices of goods and services, such as proximity of the products in the basket of goods to points of sale, the different sales channels in operation and the individual characteristics of the goods or services being monitored.

Figure 4 presents the countries' responses regarding the alternative price collection methods used.

### » Figure 4. Alternative price collection methods used by the countries<sup>a</sup>

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of a survey conducted among national institutions responsible for producing the consumer price index (CPI) in Latin America and the Caribbean.

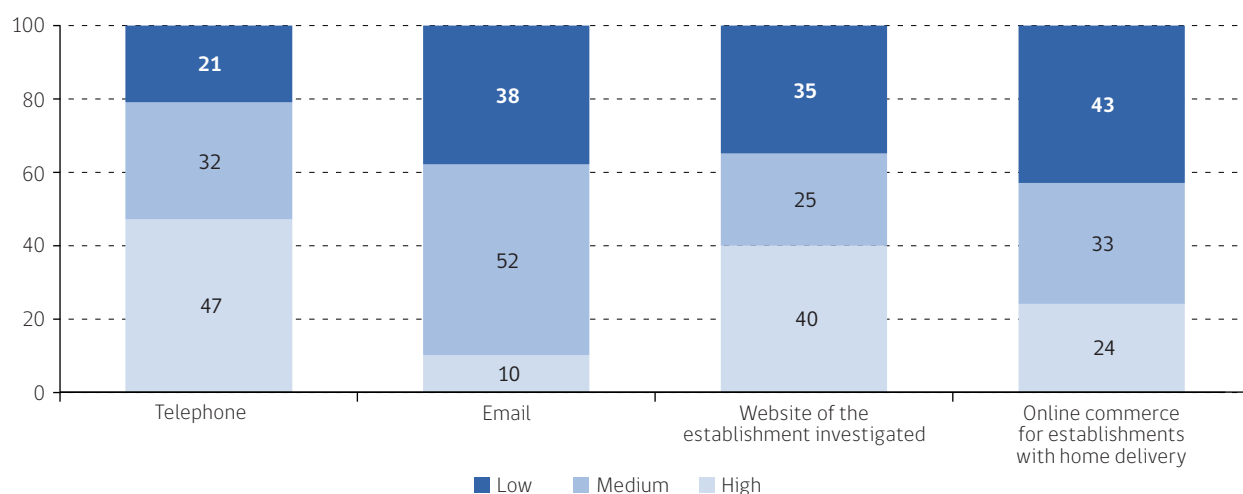
<sup>a</sup> Based on responses from the 19 countries participating in the survey.

The preferred methods are presented below. To determine preference, in addition to considering the number of countries using each method, respondents were asked to rate their experience of applying it on a scale of 1 to 9, with a score of 9 being given to the method that was most effective in practice. Figure 5 shows the methods that were used by most countries and that scored above 6 on average.

Of the methods chosen by the countries, those in which a response is obtained directly from the informant (telephone inquiry) are clearly identified as most effective, with effectiveness being deemed high for those scoring 6 and over and medium for those scoring 4 and over. Taken together, they account for more than 60% of the countries responding.

### » Figure 5. Most effective price collection methods<sup>a</sup>

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of a survey conducted among national institutions responsible for producing the consumer price index (CPI) in Latin America and the Caribbean.

<sup>a</sup> Based-on responses from the 19 countries participating in the survey.

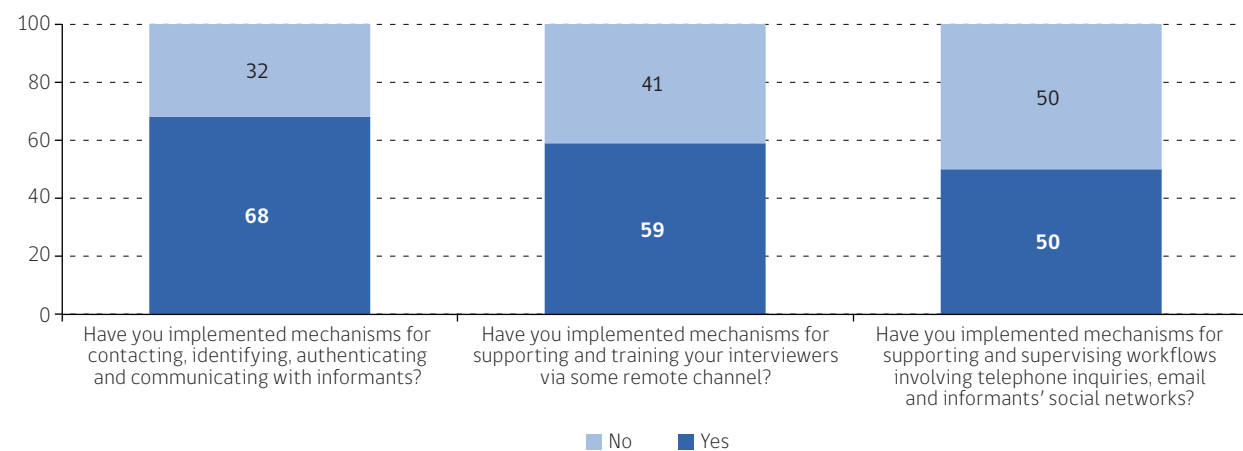
## Actions taken to implement collection methods

Implementing the new collection methods involved obtaining the contact information of informants, inviting them to respond and training the collectors and supervisors.

The survey asked about the actions taken to implement the new methods, and the results are shown in figure 6 below. These actions often had to be implemented remotely because of lockdown measures.

### » Figure 6. Actions taken to support implementation of alternative methods<sup>a</sup>

(Percentages of countries)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of a survey conducted among national institutions responsible for producing the consumer price index (CPI) in Latin America and the Caribbean.

<sup>a</sup> Based-on responses from the 19 countries participating in the survey.

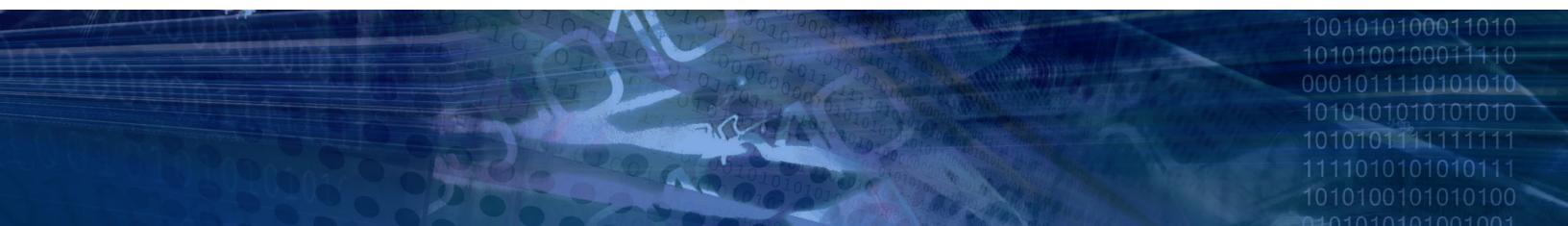
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## Conclusions

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The health emergency gave rise to a need for action to support price collection procedures for preparing the CPI, given that the restrictions on mobility established in the countries made on-site price collection unfeasible. To achieve representative coverage of the target sample for calculation of the CPI, it was necessary to implement new collection methods that could provide coverage of at least 60%.

These new options for ascertaining prices could become part of regular procedures in future, helping to strengthen price collection for the calculation of the CPI.



This publication, which is issued bimonthly, is prepared by the Statistics Division of the Economic Commission for Latin America and the Caribbean (ECLAC). This issue was prepared by Ernestina Pérez, under the overall supervision of Rolando Ocampo, Chief of the Statistics Division.

<https://www.cepal.org/en/work-areas/statistics>



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