EMIX Recombination Tricks

All of what follows is sketches rather than data structures or schemas. This document is exploring some issues of EMIX as it gets squeezed through various use cases and price services and combined with WS-Calendar. Results of the conversation may flow back into WS-Calendar as well as flow forward into EnergyInterop.

The focus here is on the communication of price and product only. Although each of these communications occurs in a market context, the market context is just the use case for the communication requiring this sort of communication

1.1 Background note on WS-Calendar

The rules of WS-Calendar are becoming clearer. The basic unit of WS-calendar is the Interval, a fixed length of time in which something of interest occurs is reported. This thing of interest is normally conveyed using XPOINTER.

One or more Intervals can be aggregated into a Sequence. Intervals in a Sequence have a temporal relationship to each other. A start date/time can be assigned to any Sequence whereafter it is a scheduled sequence. Through the temporal relationships, the start And finish time of all intervals in a sequence can be known from the start time of the first element in a sequence.

The Partition is a form of the Sequence is one in which all Intervals have the same duration, and most of the “something of interest” is identical. For example, energy prices at 15 minute intervals throughout the day can be reported as a partition. The energy product is invariant, the intervals have the same duration and are consecutive, and the price only changes throughout the day. This allows simplifying assumptions to be made when transmitting these prices.

It is unclear at this time whether a WS-Calendar communication can include more than one sequence, i.e., more than one set on inter-related Intervals. It appears that either each Interval has its own XPOINTER to its own Interval service information (say a full EMIX package) or that all Intervals share the same Interval service information. Partitions are meant to be simple and lean; they will be required to share the same Interval Service information.

To be useful, the varying part of the Interval Service information must be detachable and that only varying within a partition. An example is a price schedule for a given energy product, or a load schedule for a particular site.

The illustrations below assume this meaning of Interval, assembled into Partitions. Sometimes these Partitions are Scheduled.

1.2 Simple Case of EMIX

The simplest EMIX if of course the one time, one amount, one price model

```
<product description which may be quite large>
<start time>
<interval>
<price per unit>
<quantity>
<extended price>
```

For a simple purchase, full requirements, the price service needs only transmit:

```
<product description which may be quite large>
<start time> (may be midnight, or now)
<interval> (may be all day)
<price per unit>
```

To report the amount used, during an interval, we need

```
<product description which may be quite large>
<start time>
<interval>
<price per unit>
<quantity>
<extended price>
```

Everything has to be there, everything appears just once, there are no efficiency arguments for packing it one way or another.

1.3 Price Service is offering a Full Requirements Schedule

Perhaps this is describing tiered pricing.

```
<product description which may be quite large>
<start time>
<interval><price per unit></interval>
<interval><price per unit></interval>
<interval><price per unit></interval>
<interval><price per unit></interval>
<interval><price per unit></interval>
<interval><price per unit></interval>
<interval><price per unit></interval>
<interval><price per unit></interval>
```

Quantities are not known. Because offer is Full Requirements, usage is limited only by capacity of feeders.

1.4 Load Shape is offered, executed

At the load shape offer, neither price nor schedule is known. A load shape is an indication of a willingness to buy fixed amounts of energy over a schedule.

```
<product description which may be quite large>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
```

Later, two bids come back, each with a proposed schedule

```
<product description which may be quite large>
<start time 1>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<fixed extended price 1>
```

And

```
<product description which may be quite large>
<start time 2>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<interval><quantity><interval>
<fixed extended price 2>
```

The purchaser using the extended price and other knowledge of his own needs selects the schedule and price that suits him. Note that there may be differences in the product offered. The purchaser may prefer uninterruptible power, which may not be available on all schedules. The price differential may be enough It may be that he chooses it anyway.

1.5 Reporting purchases made during a day

In a dynamic market, prices change, and whatever is consumed is consumed. If the product mixes change as well,then the product must be re-transmitted again and again.

```
<start time>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<interval>
  <product description which may be quite large>
  <price per unit>
  <quantity>
<extended price>
```

If a single product is purchased over the entire period, but with dynamic pricing, then this can be compressed as follows:

```
<product description which may be quite large>
<start time>
<interval>
  <price per unit>
  <quantity>
<interval>
  <price per unit>
  <quantity>
<interval>
  <price per unit>
  <quantity>
<interval>
  <price per unit>
  <quantity>
<interval>
  <price per unit>
  <quantity>
<interval>
  <price per unit>
  <quantity>
<interval>
  <price per unit>
  <quantity>
<extended price>
```

1.6 Discussion

What I am reaching for here is that we need to be able to express the energy artifact with a two re-locatable components. The actual quantity and the actual price are attributes that need to be re-locatable into the time series.

Is this an EMIX rule, wherein the Service Type tells you which element is thrust into the time series? We see series here in which Quantity only is in the intervals, Unit Cost only is in the intervals, or bother are in the intervals.