Optimization problem starts with initial wafer-lot production schedule and new die request. To solve the problem, wafer-lot schedule has to be altered to support all demand. Schedule can be altered by changing individual wafer-lot schedule in three major ways: pull-in, push-out, and offload. Pull-in wafer-lot means to produce the wafer-lot earlier. Push-out means to produce the wafer-lot later. Offload means to produce the wafer-lot in another fab. All wafer-lot schedule alterations must comply with existing constraints. Wafer production is a complex process in a microchip manufacturing plant. Each fab can produce limited quantity of wafers in selected time window. The time window is one Week. With known or predicted future die demand it is possible to create wafer-lot production schedule that maximizes the efficiency of fabs and supports all the requested demand. Moreover, it is desired to support this new demand while having the lowest number of changes to the schedule possible.

TimeBucket.csv – time format translation information (14 weeks)

* WeekId – Unified week ID used as “TimeBucket”
* MonthId – Corresponding month ID
* YearWW – Year and week of the year
* YearMonth – Year and month of the year
* Month – Month of the year
* Quarter – Quarter of the year
* Year – Year

WaferLots.csv – wafer and corresponding current schedule information (300 wafer lots)

* ProdLocNamem - product of the wafer (P\* constant) and manufacturing location of the current schedule (F\*\* subject to change during optimization)
* LotName – Name of the wafer lot
* Wafer Quantity - number of wafers in the wafer lot. The wafer lot is not divisible and must be committed all at once
* CommitWeek – week of the current schedule expressed in YearWW format

PullInPushOutQuantity.csv – information of new demand to be met (24 independent requests)

* ProductLocationName – product (P\*) demanded at lonation (F\*\*)
* TimeBucket – weekId of the demand (to be met before or on time but not later)
* DPW – Dies per wafer, number of dies each wafer yields of the requested product
* RequiredDieOutQuantity – the total number of dies required to be produced

Pullin\_Pushout.csv – combinations of options for simultaneous pull in and push out that are allowed, pull in can be done without corresponding push out but push out cannot be done without pull in (2 definitions)

* PullInProdLocName – product name and fab of allowed pull in operation
* PushOutProductLocName – product name and fab of push out operation that is together with pull in described above

ProductLocation.csv – description of product groups and which fabs are equipped to manufacture product groups and products (4 definitions)

* ProductGroup – product group the product belongs to
* Location – fab at which product can be manufactured
* Product – the product name at the location and product group

Capacity.csv – the manufacuting capabilities information of each fab product group each week (14 definitions)

* ProductGroupName – product group at fab location information
* TimeBucket – WeekId at which capacity fab capacity is defined
* Capacity – the number of wafers that fab can produce at a given week