



集成**crscent**混合dex: <https://github.com/crescent-network/crescent/tree/main/q/liquidity> 官方9.22号的版本, > v3.0.0-rc1 版本

一: **bmcchain.dex**代码合并记录:

10.24日合并: <https://github.com/crescent-network/crescent/commit/3f085f75b0edd44e62dd24de699694ca38f277e176>

二: 需要新增特性:

- 通过治理提案来Disable指定的pool池
 - 实现Swap_fee_rate费率的功能。需要在order订单结构中记录此值, 在finish订单时按照此值扣除或者返回swap费用。
可以考虑是否需要为每个pair再增加一个收集swapfee的托管账户, 以及一个分发swap费用的farm机制
 - 3.方便农民根根: <https://github.com/tendermint/farming>
- 三: 主要结构体信息:
- ```
1.1 dex模块参数: ./bmcchain d dex params
batch_size: 1 // 批处理的间隔, 指定区块间隔批量处理一次
deposit_extra_gas: "60000" // 存款交易的额外gas费用
dust_collector_address: bmc1kzgl77g3sk2qm4au2d8gtqq4zp848uhmzmjstvgesz8aqjhtlq4uc08a // 收集订单匹配match时灰尘资金, farming模块衍生地址
fee_collector_address: bmc12c8xy43q5ykevk7lgrkrkx98kvay9sm9nzzu7c58qch8aa74aqs979g4j // 收集创建pair和pool的费用, farming模块衍生地址
max_market_making_order_ticks: 10 // 构建mmi订单时按照10个档次构建单位price的限价订单
max_order_lifespan: 86400s // 订单最长链上时间
max_price_limit_ratio: "0.100000000000000000" // 限价订单的限价比率, 相对于pair的当前价格, 当前价格10, 订单限价9-11之间, 订单价格在此之内
min_initial_pool_coin_amount: "1000000"
min_initial_pool_coin_supply: "100000000000000"
order_extra_gas: "37000" // 提交订单的额外gas费用
pair_creation_fee: 86400s // 创建交易的费用, 转移到dex模块的fee_collector_address账户
- amount: "100000000000000000000"
pool_creation_fee: // 创建交易pool池的费用, 转移到dex模块的fee_collector_address账户
- amount: "100000000000000000000"
denom: abmx
swap_fee_rate: "0.000000000000000000" // 订单交易费率, 目前没有体现出来。comdex项目已经实现在pair增加一个swapFeeAddress需要增加一个字段
tick_precision: 4 // 订单价格精度
withdraw_extra_gas: "64000" // 取款交易的额外gas费用
withdraw_fee_rate: "0.000000000000000000" // 从池中中提取时的税费, 也就是退回到池中
```

**问题:**目前看comdex实现swap\_fee\_rate可能存在个问题, 如果在下单和finish订单时swap\_fee\_rate值不一致时, 会导致pair托管账户余额错误, 这样就会导致pair\_escrowAddress账户亏损0.5-0.3=0.2个offercoin, 用户多得了100.5-100.3=0.2个offercoin  
此时部分需要上交的swapFee费用会按照当前的费率算, 100\*0.5%-0.5个offercoin  
此时需要再swapFee费用从pair\_escrowAddress转移到SwapFeeCollectorAddress账户0.5个offercoin, 导致pair\_escrowAddress账户亏损0.5-0.3=0.2个offercoin  
3.部分成交: 会导致返回给用户的资产增多, 以及转移到SwapFeeCollectorAddress账户也多。  
导致pair\_escrowAddress账户有亏损

**建议:**为了实现swapfee收取, 应该在order订单结构体中增加一个swapfeerate的字段, 记录下单时设置的费率, 然后再finish订单时按照此字段扣除swapfee, 这样就可以避免swapfeerate变化导致托管账户或者用户亏损的问题。  
**OK提醒:**也存在同样的问题, 在chargeFee函数中订单有成交之后, 会根据成交订单和TradeFeeRate交易费率计算一个交易处理费用给pair构建者在GetDeaFee函数中计算feeAmt := quantity.Mul(feeParams.TradeFeeRate) 从用户地址转移到ProductOwner地址。  
用户下单时没有冻结账户的tradeFee费用, 只冻结了交易在链的费用amount := order.FeePerBlock.Amount.Mul(order.ExpireBlocks)  
如果扣除tradeFee失败没有将失败信息返回给上层处理, 可能导致系统异常。

```
1.2 pair:
type Pair struct {
 Id uint64
 BaseCoinDenom string
 QuoteCoinDenom string
 EscrowAddress string // 订单的资产存入这个托管地址上, 由交易引擎来撮合, farming模块衍生地址
 LastOrderId uint64
 LastPrice string // github.com/cosmos/cosmos_sdk/types/Dec
 CurrentBatchId uint64
}

1.3 pool: 可以考虑通过治理天dsable指定的pool池子, 需要自实现。
type Pool struct {
 Type PoolType // Limit,Market,MM
 Id uint64
 PairId uint64
 Creator string // 交易所中剩余资产的账户地址, farming模块衍生地址
 ReserveAddress string // 交易所token: poolId
 PoolCoinDenom string // 交易所token: poolId
 MaxPrice string // github.com/cosmos/cosmos_sdk/types/Dec
 MinPrice string // github.com/cosmos/cosmos_sdk/types/Dec
 LastDepositRequestId uint64
 LastWithdrawRequestId uint64
 Disabled bool
}

1.4 order订单结构:
type Order struct {
 Type OrderType // Limit,Market,MM
 Id uint64
 PairId uint64
 MsgHeight int64
 Order string
 Direction OrderDirection // 订单的出价方向
 OfferCoin types.Coin // 订单的总出价资产的数量
 RemainingOfferCoin types.Coin // remaining_offer_coin specifies the remaining offer coin
 ReceivedCoin types.Coin // received_coin specifies the received coin after the swap
 Price Dec // price specifies the price that an orderer is willing to swap
 Amount Int // buy: 买入basecoin的数量, sell: 卖出basecoin的数量
 OpenAmount Int // 订单还需要买入/卖出的basecoin数量, 匹配的过程中会减去已成交的数量
 BatchId uint64 // batch_id specifies the pair's batch id when the request is stored
 ExpireAt time.Time
 Status OrderStatus
}

备注: 订单amount有最小和最大值限制:
MinCoinAmount = sdk.NewInt(100)
MaxCoinAmount = sdk.NewIntWithDecimal(1, 40)

1.4.1 订单本结构:
type OrderBook struct {
 buys *orderBookTicks
 sells *orderBookTicks
}

orderBookTicks struct {
 ticks []*orderBookTick
 priceIncreasing bool
}

orderBookTick struct {
 price sdk.Dec
 orders []Order
}

1.4.2 pool池订单结构:
PoolOrder struct {
 amm.Pool
 Id uint64
 ReserveAddress sdk.AccAddress
 BaseCoinDenom, QuoteCoinDenom string
}
```

四: 基本命令行操作

```
1.构建uatom-usdt的交易对生成一个唯一的pairid:基础base-coin=uatom; 报价quote-coin=usdt
./bmcchain tx dex create-pair uatom usdt --from hyb1 --gas-prices 1000abmx
./bmcchain tx dex create-pair uatom busd --from hyb1 --gas-prices 1000abmx
./bmcchain tx dex create-pair aevmos busd --from hyb1 --gas-prices 1000abmx
./bmcchain tx dex create-pair ugraviton busd --from hyb1 --gas-prices 1000abmx

./bmcchain tx dex create-pair ujuano usdt --from hyb1 --gas-prices 1000abmx
./bmcchain tx dex create-pair steth busd --from hyb1 --gas-prices 1000abmx
./bmcchain tx dex create-pair wbtc busd --from hyb1 --gas-prices 1000abmx

修改: 需要校验pair的base-quote交易对是否存在。a:b和b:a认为是同一个交易对, 需要校验掉

2.查询构建的交易对:
./bmcchain d dex pair 1
pair:
 base_coin_denom: uatom
 current_batch_id: "4052"
 escrow_address: bmc1xutvc4z4z4qvrqyskqf555gm7ggd7wtpzcnr0300q4vz5gm4mtqw3563k
 id: "1"
 last_order_id: "8"
 last_price: "13.000000000000000000"
 quote_coin_denom: usdt

3.构建uatom-usdt交易的pool池
./bmcchain tx dex create-pool 1 1000000000uatom,13000000000usdt --from hyb1 --gas-prices 1000abmx

4.查询pool池信息: 备注: 每个交易对最多允许建立50个pool当前生效的池子。但是一个交易对只允许创建一个基础pool池
./bmcchain d dex pool 1
pool:
 balances:
 base_coin:
 amount: "1000007000"
 denom: uatom
 quote_coin:
 amount: "12999909009"
 denom: usdt
 creator: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 disabled: false
 id: "1"
 last_deposit_request_id: "0"
 last_withdraw_request_id: "0"
 min_price: null
 max_price: null
 pair_id: "1"
 pool_coin_denom: pool1
 pool_coin_supply: "100000000000000"
 price: "12.99981801027328083"
 reserve_address: bmc1n4tt7fvpjdhuyhj2rezm0m7gduuuf08azrszda1mmrk1e66j8xqlhtpda
 type: POOL_TYPE_BASIC

5.构建买入uatom的买入单: 使用usdt买入1000个uatom, 单价是14usdt,
./bmcchain tx dex limit-order 1 buy 14000usdt uatom 11 100 --from hyb5 --gas-prices 1000abmx --order-lifespan=10m

6.查询此买入订单信息:
./bmcchain d dex order 1 12
order:
 amount: "1000"
 batch_id: "4459"
 direction: ORDER_DIRECTION_BUY
 expire_at: "2022-09-23T10:06:49.873794Z"
 id: "12"
 msg_height: "4574"
 offer_coin:
 amount: "12000"
 denom: usdt
 open_amount: "1000"
 orderer: bmc1c6m3u45vf4a8ufay200tjwxc8pv6ywf0p292
 pair_id: "1"
 price: "12.000000000000000000"
 received_coin:
 amount: "0"
 denom: uatom
 remaining_offer_coin:
 amount: "12000"
 denom: usdt
 status: ORDER_STATUS_NOT_MATCHED
 type: ORDER_TYPE_LIMIT

7.构建卖出uatom的卖出单
./bmcchain tx dex limit-order 1 sell 13000uatom usdt 13 10000 --from hyb1 --gas-prices 1000abmx --order-lifespan=10m

8.查询卖出订单信息: ./bmcchain d dex order 1 13
order:
 amount: "10000"
 batch_id: "4668"
 direction: ORDER_DIRECTION_SELL
 expire_at: "2022-09-23T10:16:07.384611Z"
 id: "13"
 msg_height: "4683"
 offer_coin:
 amount: "10000"
 denom: uatom
 open_amount: "10000"
 orderer: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 pair_id: "1"
 price: "13.000000000000000000"
 received_coin:
 amount: "0"
 denom: usdt
 remaining_offer_coin:
 amount: "10000"
 denom: uatom
 status: ORDER_STATUS_NOT_MATCHED
 type: ORDER_TYPE_LIMIT

9.查询订单的历史状态: ./bmcchain d dex order 1 1 --height 22400
order:
 amount: "1000"
 batch_id: "2204"
 direction: ORDER_DIRECTION_BUY
 expire_at: "2022-09-30T07:44:29.259806Z"
 id: "1"
 msg_height: "22400"
 offer_coin:
 amount: "14000"
 denom: usdt
 open_amount: "0"
 orderer: bmc1c6m3u45vf4a8ufay200tjwxc8pv6ywf0p292
 pair_id: "1"
 price: "14.000000000000000000"
 received_coin:
 amount: "1000"
 denom: uatom
 remaining_offer_coin:
 amount: "999"
 denom: usdt
 status: ORDER_STATUS_COMPLETED
 type: ORDER_TYPE_LIMIT
```

```
sell limit:
./bmcchain tx dex limit-order 1 sell 13000uatom usdt 12.6 1000 --from hyb1 --gas-prices 1000abmx --order-lifespan=10m

buy limit:
./bmcchain tx dex limit-order 1 buy 1300usdt uatom 12.7 100 --from hyb5 --gas-prices 1000abmx --order-lifespan=10m

Deposit:
./bmcchain tx dex deposit 1 10uatom,130usdt --from hyb2 --gas-prices 1000abmx --gas 203408

Withdraw:
./bmcchain tx dex withdraw 1 100pool1 --from hyb2 --gas-prices 1000abmx
```

```
market-order: 订单需要按照当前价格计算出价: 备注 (buy卖出单=lastprice* (1+ maxPriceLimitRatio))
 offercoin不能少于计算得出的buy买单的offercoin
./bmcchain tx dex market-order 1 buy 1500usdt uatom 100 --from hyb1 --gas-prices 1000abmx

//实际成交价格= (1430-130)usdt/100uatom
查询market订单买入结果: ./bmcchain d dex order 1 9 --height 86638
order:
 amount: "100"
 batch_id: "86442"
 direction: ORDER_DIRECTION_BUY
 expire_at: "2022-10-13T02:43:45.515230Z"
 id: "9"
 msg_height: "86638"
 offer_coin:
 amount: "1430"
 denom: usdt
 open_amount: "100"
 orderer: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 pair_id: "1"
 price: "14.298000000000000000" //根据lastprice* (1+ maxPriceLimitRatio) 计算所得的价格
 received_coin:
 amount: "100"
 denom: uatom
 remaining_offer_coin:
 amount: "130"
 denom: usdt
 status: ORDER_STATUS_COMPLETED
 type: ORDER_TYPE_MARKET
```

```
market订单的卖出价格: 备注 (出价=lastprice* (1- maxPriceLimitRatio))
./bmcchain tx dex market-order 1 sell 1000uatom usdt 1000 --from hyb1 --gas-prices 1000abmx

//实际成交价格=12999usdt/1000uatom
market 卖出订单的结果: ./bmcchain d dex order 1 10 --height 86946
order:
 amount: "1000"
 batch_id: "86750"
 direction: ORDER_DIRECTION_SELL
 expire_at: "2022-10-13T02:54:34.474605Z"
 id: "10"
 msg_height: "86946"
 offer_coin:
 amount: "1000"
 denom: uatom
 open_amount: "0"
 orderer: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 pair_id: "1"
 price: "11.700000000000000000" //根据lastprice* (1- maxPriceLimitRatio) 计算所得价格
 received_coin:
 amount: "12999"
 denom: usdt
 remaining_offer_coin:
 amount: "0"
 denom: uatom
 status: ORDER_STATUS_COMPLETED
 type: ORDER_TYPE_MARKET
```

```
构建RangedPool: bmcchain tx dex create-ranged-pool [pair-id] [deposit-coins] [min-price] [max-price] [initial-price]
提供初始poolpool, 只在指定范围之外提供流动性参与交易撮合。
目前系统只支持一个交易对最多支持50个pool(只包括一个basicpool, 多个rangedpool)。
为了后可能存在某些rangedpool的流动性不好, 需要更换资产池。
我们需要实现一个disable指定pool池的提案处理流程, 由社区投票确定取消指定pair交易对的pool池, 只可以disable, 不可以enable。
Disable的Pool池不可以再Deposit存款, 而在Withdraw取款时需要判断Pool池是否被耗尽, 还有余额就支持取款。
系统退出的条件: 1. Pool池资产被耗尽, 不可再存款; 2. 通过治理提案关闭, 此时可以取款
```

```
自动设置Pool的逻辑: Pool的储备资产或者poolcoin被耗尽
// IsDepleted returns whether the pool is depleted or not.
func (pool *BasicPool) IsDepleted() bool {
 return pool.ps.IsZeroC() || pool.rx.IsZeroC() || pool.ry.IsZeroC()
}

// IsDepleted returns whether the pool is depleted or not.
func (pool *RangedPool) IsDepleted() bool {
 return pool.ps.IsZeroC() || (pool.rx.IsZeroC() && pool.ry.IsZeroC())
}

./bmcchain tx dex create-ranged-pool 1 1000000uatom,10000000usdt 12.001 14.999 13.999 --from hyb1 --gas-prices 1000abmx --gas 300811
```

```
查询RangedPool
./bmcchain d dex pool 10
pool:
 balances:
 base_coin:
 amount: "12135444"
 denom: uatom
 quote_coin:
 amount: "15829232"
 denom: usdt
 creator: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 disabled: false
 id: "10"
 last_deposit_request_id: "0"
 last_withdraw_request_id: "0"
 min_price: "14.999000000000000000"
 max_price: "12.00100000000000000000"
 pair_id: "1"
 pool_coin_denom: pool10
 pool_coin_supply: "100000000000000"
 price: "13.002716587457696380"
 reserve_address: bmc1farjyfn74k84yofv6h5t6s418yle349gk56kv676556erf63ffsln02y8
 type: POOL_TYPE_RANGED
```

**构建一个单币池:** 初始只有一种资产: 币价格波动大时实现低价买入, 高价卖出的场景  
备注: 初始只deposit资产Y, sell卖出资产在min-price - max-price价格区间  
max-price == initial-price: 初始只deposit资产Y, buy买入Y资产在min-price - max-price价格区间

**构建一个只有X资产的高buy买入池:**  
./bmcchain tx dex create-ranged-pool 1 1000000uatom,10000000usdt 1.001 2.99 2.99 --from hyb1 --gas-prices 1000abmx --gas 300811

查询单币池信息: ./bmcchain d dex pool 16  
pool:
 balances:
 base\_coin:
 amount: "0"
 denom: uatom
 quote\_coin:
 amount: "100000000"
 denom: usdt
 creator: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 disabled: false
 id: "16"
 last\_deposit\_request\_id: "0"
 last\_withdraw\_request\_id: "0"
 min\_price: "2.990000000000000000"
 max\_price: "1.00100000000000000000"
 pair\_id: "1"
 pool\_coin\_denom: pool16
 pool\_coin\_supply: "100000000000000"
 price: "2.9900000000000000002"
 reserve\_address: bmc1vst9zfvwgv15scvgkv7zytz3vltz7cnyf6vc6cdunxdyhaq0fxva2
 type: POOL\_TYPE\_RANGED

**构建一个只有Y资产的低sell卖出池:**  
./bmcchain tx dex create-ranged-pool 1 1000000uatom,10000000usdt 1000.1 1400.9 1000.1 --from hyb1 --gas-prices 1000abmx --gas 300811

查询pool信息: ./bmcchain d dex pool 19  
pool:
 balances:
 base\_coin:
 amount: "1000000"
 denom: uatom
 quote\_coin:
 amount: "0"
 denom: usdt
 creator: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 disabled: false
 id: "19"
 last\_deposit\_request\_id: "0"
 last\_withdraw\_request\_id: "0"
 min\_price: "1000.900000000000000000"
 max\_price: "1400.100000000000000000"
 pair\_id: "1"
 pool\_coin\_denom: pool19
 pool\_coin\_supply: "100000000000000"
 price: "1000.09999999999991426"
 reserve\_address: bmc1vst9zfvwgv15scvgkv7zytz3vltz7cnyf6vc6cdunxdyhaq0fxva2
 type: POOL\_TYPE\_RANGED

**做市商MM订单:**  
bmcchain tx dex mm-order [pair-id] [max-sell-price] [min-sell-price] [sell-amount] [max-buy-price] [min-buy-price] [buy-amount] [flags]  
[buy-amount] [flags]  
./bmcchain tx dex mm-order 1 14.299 13.001 1000 12.999 11.801 1000 --from hyb1 --gas-prices 1000abmx --order-lifespan 24h --gas 400217

**备注:** max和min的价格必须在当前价格的浮动范围内, 构建一系列的限价订单  
构建新的MM订单时需要删除此用户在此pair下的已存在的MM订单

**执行结果返回:** 按照系统设置的max\_num\_market\_making\_order\_ticks生成10个买单和10个卖单。  
order\_ids: 34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53

**取消MM订单:** 取消指定pair-id下指定用户的所有未成交的mm订单  
./bmcchain tx dex cancel-mm-order 1 --from hyb1 --gas-prices 1000abmx --gas 1001595

**执行结果返回:** 取消未成交的mm订单  
canceled\_order\_ids: 34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52

**查看已成交的mm订单**  
./bmcchain d dex order 1 53 --height 141409  
order:
 amount: "100"
 batch\_id: "141213"
 direction: ORDER\_DIRECTION\_SELL
 expire\_at: "2022-10-25T07:19:07.635897Z"
 id: "53"
 msg\_height: "141409"
 offer\_coin:
 amount: "100"
 denom: uatom
 open\_amount: "0"
 orderer: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 pair\_id: "1"
 price: "13.00100000000000000000"
 received\_coin:
 amount: "1300"
 denom: usdt
 remaining\_offer\_coin:
 amount: "0"
 denom: uatom
 status: ORDER\_STATUS\_COMPLETED
 type: ORDER\_TYPE\_MM

**单边MM订单:** 只有sell卖单的MM订单  
备注: 通过治理提案来关闭MM订单只提供buy/sell的单边订单  
./bmcchain tx dex mm-order 1 8.699 8.001 1000 0 0 0 --from hyb1 --gas-prices 1000abmx --order-lifespan 24h --gas 400217

**构建对应数量的限价sell卖单, 并删除已经存在的MM订单**  
返回执行结果:  
key: order\_ids  
- value: 201,202,203,204,205,206,207,208,209,210  
- key: canceled\_order\_ids  
value: 150,151,152,153,154,155

**查看对应的限价订单:**  
./bmcchain d dex order 1 202  
order:
 amount: "100"
 batch\_id: "251910"
 direction: ORDER\_DIRECTION\_SELL
 expire\_at: "2022-11-09T08:19:02.939878Z"
 id: "202"
 msg\_height: "252106"
 offer\_coin:
 amount: "100"
 denom: uatom
 open\_amount: "100"
 orderer: bmc1as43p7j7mfumkvdhj27nznz01ypv5v1kn8un8y
 pair\_id: "1"
 price: "8.62150000000000000000"
 received\_coin:
 amount: "0"
 denom: usdt
 remaining\_offer\_coin:
 amount: "100"
 denom: uatom
 status: ORDER\_STATUS\_NOT\_MATCHED
 type: ORDER\_TYPE\_MM