Basic

V2 White Paper

Trading From a Smart Contract

1. transferFrom() transfer the amount of tokens to the contract.
2. Approve the router to withdraw the tokens.
3. Swap.

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Pool

Why pool?
Main cause is that blockchain-native liquidity protocol should take advantage of the trust code execution environment, the autonomous and perpetually running virtual machine.

Flash Swap

It's an effectively democratizing arbitrage method of Uniswap. You withdraw some tokens without swapping (paying), then you repay it with some fees. This is like a loan mechanism, but without the collateral.

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Router

The primary purpose of routers is to execute the logic checks. For example, checking some static errors such as "allowing transactions to linger in the mempool long enough for the sender's expectations about prices to no longer be accurate" .

https://docs.uniswap.org/contracts/v2/reference/smart-contracts/router-02

Oracle

Avoid sandwich attacks.

Because some unsophisticated oracles breed arbitrage (negative one, or attack), Uniswap uses “TWAP” to feed cumulative price, which you can use to divide a desired time interval to get your own securely desired price.

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Changes across versions

	V1	V2
Pricing Function	Aggregation of Pricing and Safety Check	Separation of concerns

	v2	v3
Gas Fee		A significant amount of care and attention has been given to gas optimization in the core contracts.
Factory		Multiple pools per token pair; A fee parameter