

ANATOMY OF A 1X DRIVETRAIN

WHAT IS A 1X DRIVETRAIN?

A one-by—or 1x—drivetrain refers to a setup with a single chainring up front and any number of gears on the cassette. The most commonly seen today are 1x10, 1x11 and 1x12. The concept of 1x drivetrains is nothing new, but new technology has made this type of setup very popular.

WIDE RANGE CASSETTE:

A wide range cassette is a cassette with a wide spread of gears. This includes a small gear, usually a 10t or 11t for higher top speeds and then an evenly spaced array of gears, all the way to the tallest gear - for climbing. This would be a 42t, 46t, 50t or even a whopping 52t which is the case with a few brands nowadays.

CHAIN LINE / SPACING:

The chain line directly relates to the shifting quality and lifetime of components. This position can be optimized for 1x systems.

1x SPECIFIC CRANKSET:

Crankset can only fit a single chainring.

REAR DERAILLEUR:

Clutch Technology on rear derailleurs means that there is less slack in the chain. This improves chain retention over rough terrain, and reduces chainslap. Less noise + less frame damage.

NW CHAINRING:

Chainring design has evolved to the point where a narrow tooth is followed by a wider tooth. This technology is referred to as Narrow Wide Chainrings. This improves chain retention without the need for an additional chain guide. Lower tooth count means easier climbing, but less top speed.

As with modern advances, component designers and manufacturers spend R&D money on the newest and most prominent tech - and so with 1x leading the charge - 2x and 3x systems are not getting any attention from an R&D perspective anymore, meaning that the tech is quickly becoming outdated compared to the newest 1x systems

UNDERSTANDING THE 1X DRIVETRAIN SHIFT

AESTHETICS:

Bike design can more closely follow function, and intended design language without the additional complications and requirements that multi-chainring setups and front derailleurs present. This means better looking bikes.

CLEANING:

Without a FD, the chain can be moved well away from the crank. This makes it easier to clean and less likely to build up mud.

Chain wrap – degrees of chain that engage with the cassette, determines how the load is distributed.

CHAIN RETENTION:

The clutch mechanism effectively lessens chain bounce over rough terrain.

WEIGHT:

A 1x drivetrain can be significantly lighter than a 2x or 3x drivetrain. This, for weight sensitive riders or bikes, can make a massive difference in the overall weight of the bicycle.

SIMPLICITY:

Ease of use - single shifter to get used to. This means: Less thinking more pedaling.

Ease of installation. Single cable to rear derailleur.

WEAR & MAINTENANCE:

Availability of parts and spares - older systems are becoming more difficult to work on due to this. Yes, 1x is much simpler and easier to find parts for as well as easier and cheaper to maintain. Also less components to wear against, compared to FD changing gears.

IMPROVED GROUND CLEARANCE:

More ground clearance with a single chainring

1x DRIVETRAIN COMPARED TO 2x & 3x DRIVETRAINS

3x Clearly has the highest top speed

3x drivetrains with a large chainring can achieve substantially higher top speeds (few riders use this gear).

2x is just marginally faster than a 1x setup

2x drivetrains offers only marginal top speed advantages over 1x setups

Top speed on 10t equipped wide range cassettes are very close to the 2x setups

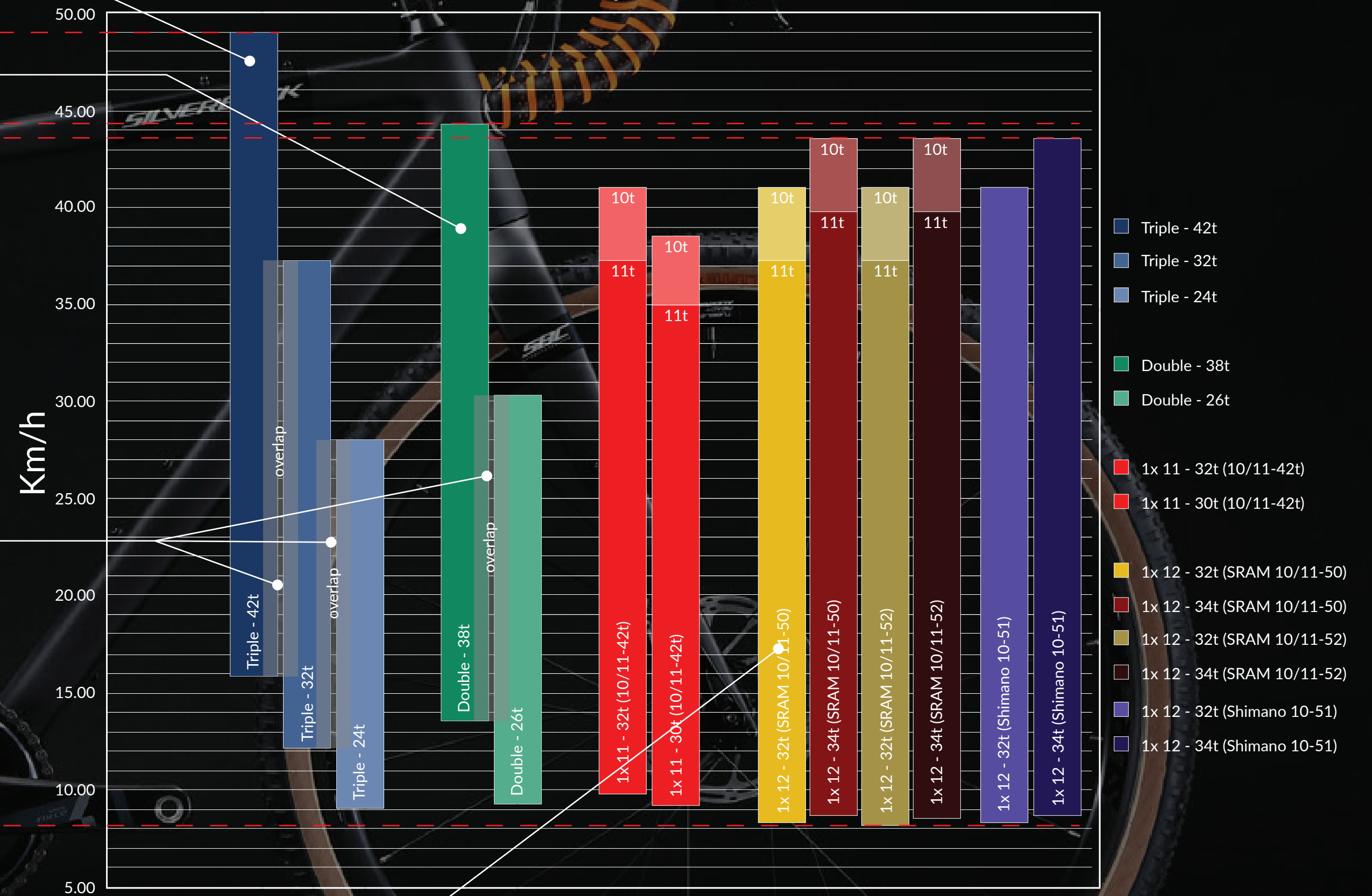
Note the gear overlaps on multi-chaining setups

This is effectively redundant gears

Wide range single speed drivetrains offer the lowest climbing gears - meaning easier climbing.

Note the 'Best of both' range that 1x12spd offers

GEAR SPEED RANGES at 90Rpm Cadence (29er wheel)



The LOW DOWN:

The climbing benefit along with the simplistic nature of 1x drivetrains, makes it an all-round winner for modern MTB riders.

Added bonus is lower weight, and easier maintenance.

Top speed benefit does not warrant the cumbersome nature and extra weight that comes with 3x drivetrains. Very few riders (especially non-pro riders) actually use or can sustain this cadence and intensity if not on long downhill sections, for prolonged periods during rides.

1X DRIVETRAIN WRAP-UP

How does this influence bike design?

Suspension platforms can be dialed in and perfectly tuned to a specific single chainring.

The chain line directly relates to the shifting quality and lifetime of components. This position can be optimized for 1x systems.

BOOST spacing makes for stiffer wheels. BOOST spacing helps with fitting 12spd cassettes.

The chainrings (1/2/3sp) is mostly considered with the drive side chainstay. The chainstay again has its implication on tyre clearance. Less chainrings = More space = More/bigger tyre clearance.

Less cluttered handlebar.

Less cables, less routing options needed.

Also frames don't necessarily need to make provision for chain devices, since the NW chainring and derailleur clutch helps to keep chain in check over rough terrain.

Wider pivots means suspension systems can be stiffer.

Front Derailleurs are designed to work within a determined range of angle between the seat tube and chain stay. Hence a consideration for geometry in BB drop and seat tube angle. No FD - means this area can be utilized for other elements or design features such as suspension pivots & geometry can be purposefully optimized.