

High Speed Developments in Japan

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High Speed Professional Conference, Czech Republic, 14-15 November 2007

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SHINKANSEN

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History of Japanese Railways

- 1872** British railway engineers brought railway in Japan
The first operation was between Tokyo and Yokohama (29 km)



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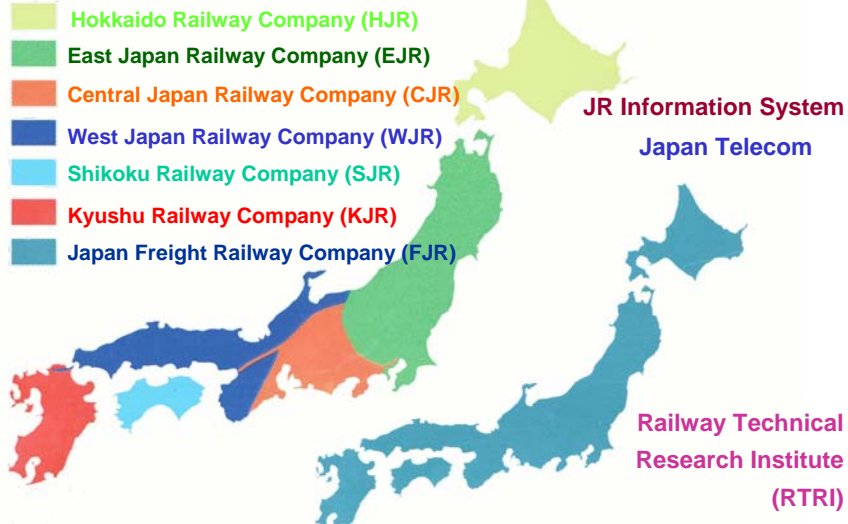
History of Railways in Japan

- 1881** Establishment of Nihon Tetsudo Kaisha, the first Japanese private railway company
- 1948** Japan National Railway (JNR) was founded by a public corporation.
- 1964** Tokaido Shinkansen (Tokyo-Osaka) was opened with a standard gauge line.
- 1987** JNR was privatised into six JR passenger and JR freight companies.



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Japanese Railways - JR Groups -



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JR Passenger Companies

	Network (km)	Staff (persons)	Transport (K pers./day)	Revenue (M Euros/day)
HJR	2.500	8.573	339	1,2
EJR	7.527	55.672	16.061	28,3
CJR	1.971	19.109	1.368	18,6
WJR	5.032	30.260	4.899	12,9
SJR	855	2.501	136	0,5
KJR	2.122	7.137	805	2,1

Data: Fiscal Year of 2004



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Japanese Bullet Trains SHINKANSEN

JR East



JR Central and West



JR Kyushu



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High-speed Network in JNR



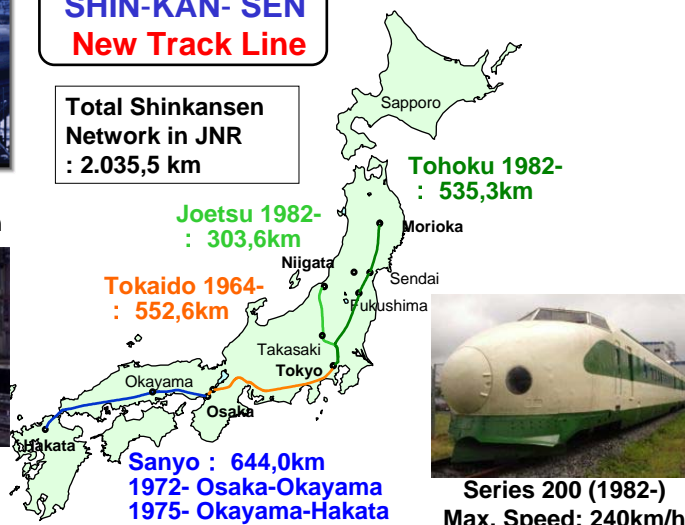
Series 0 (1964-)
Max. Speed: 220km/h



Series 100 (1985-)
Max. Speed: 220km/h

SHIN-KAN-SEN
New Track Line

Total Shinkansen Network in JNR
: 2.035,5 km

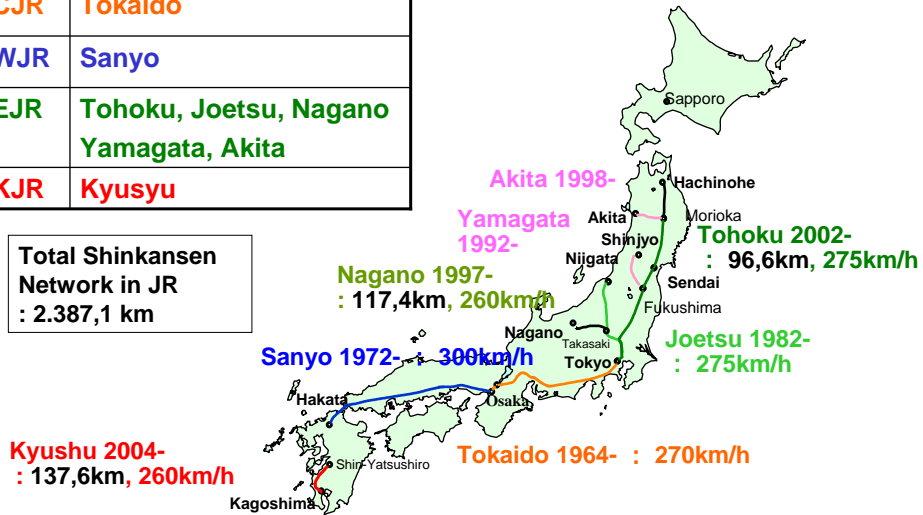


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High-speed Network in JR

CJR	Tokaido
WJR	Sanyo
EJR	Tohoku, Joetsu, Nagano Yamagata, Akita
KJR	Kyusyu

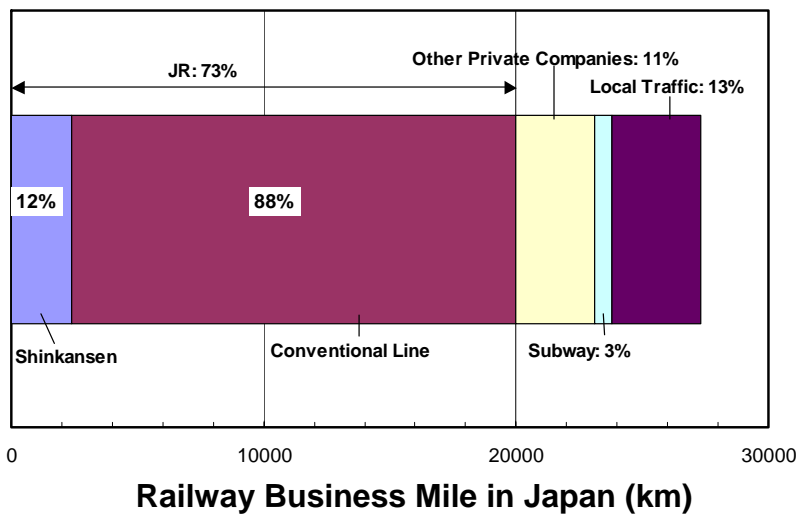
Total Shinkansen
Network in JR
: 2.387,1 km



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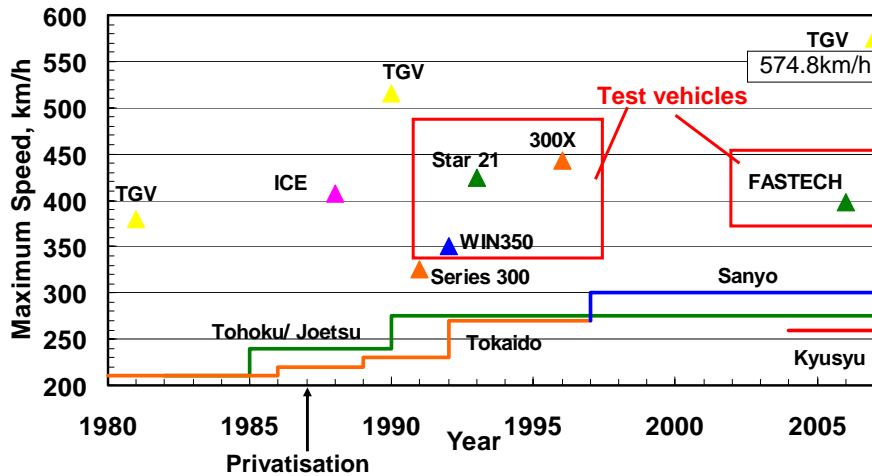
High-speed Network in JR

Data: Fiscal Year of 2004



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Fast (Shinkansen Maximum Speed)



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Tokaido and Sanyo SHINKANSEN (CJR and WJR)



Series 300 (1992-)
Max. Operation Speed: 270km/h



Series 500 (1997-)
Max. Operation Speed: 300km/h



Series 700 (1999-)
Max. Operation Speed: 285km/h



Series 700 (2000-): Rail Star
Max. Operation Speed: 285km/h
Only Hakata to Shin-Osaka



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New SHINKANSEN (CJR and WJR)



Series N700 (July 2007-)
Max. Operation Speed: 300km/h

For speedup, ride comfort and environmental friendly

- Tilting System
- Digital ATC
- Semi-active damper
- Optimisation of nose head
- Hoods between cars



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Kyusyu SHINKANSEN (KJR)

Map of Kyushu



Relay Tsubame (Limited Express)
 : Hakata-Shin Yatsushiro 1h35m



Shinkansen Tsubame Max. Speed: 260km/h
 : Shin Yatsushiro-Kagoshima Chuo 35m

The construction will be over in 2011.
 The journey time between Hakata to Kagoshima Chuo will be shorten in 1h20m.



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A variety of demands in EJR HS line

1. Increase transport capacity

- Double Decker
- Coupling and uncoupling

2. Through service

- Yamagata and Akita Shinkansens were developed for through service between Shinkansen and conventional lines.

3. Speedup

- Competition with aviation



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Increase transport capacity – Double Decker



Series E1 (1994-)
Max. Speed: 240km/h



Series E4 (1997-)
Max. Speed: 240km/h

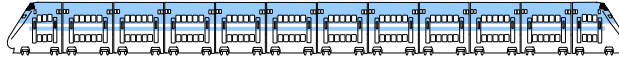
The seat capacity is increased from 885 to 1229 (+344) for 12 vehicles.



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Increase transport capacity – Coupling and Uncoupling

Series E1



- Seat capacity : 1,229 for 12 vehicles (+344)

Series E4

Longer configuration
and double-decker



- Seat capacity : 1,634 for 16 vehicles (+405)
- Operates as 8-car configuration during the daytime



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Increase transport capacity – Coupling and Uncoupling



Automatic system

Operated by only driver and conductor

Time to uncouple: 2 min 30sec.

Time to couple: 1 min 45sec.



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**Through service
between Shinkansen and conventional lines**



Series 400 (1992-)
Max. Speed: 240km/h (Shinkansen)
130km/h (Conventional)



Series E3 (1997-)
Max. Speed: 275km/h (Shinkansen)
130km/h (Conventional)

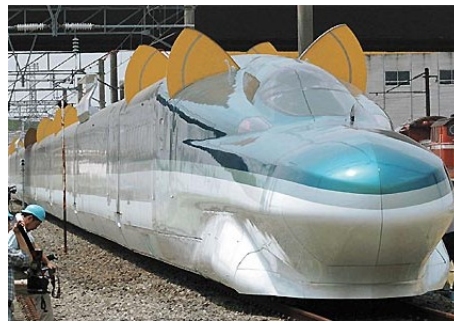


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**Speedup
Competitive with aviation**



Series E2 (1997-)
Max. Speed: 275km/h

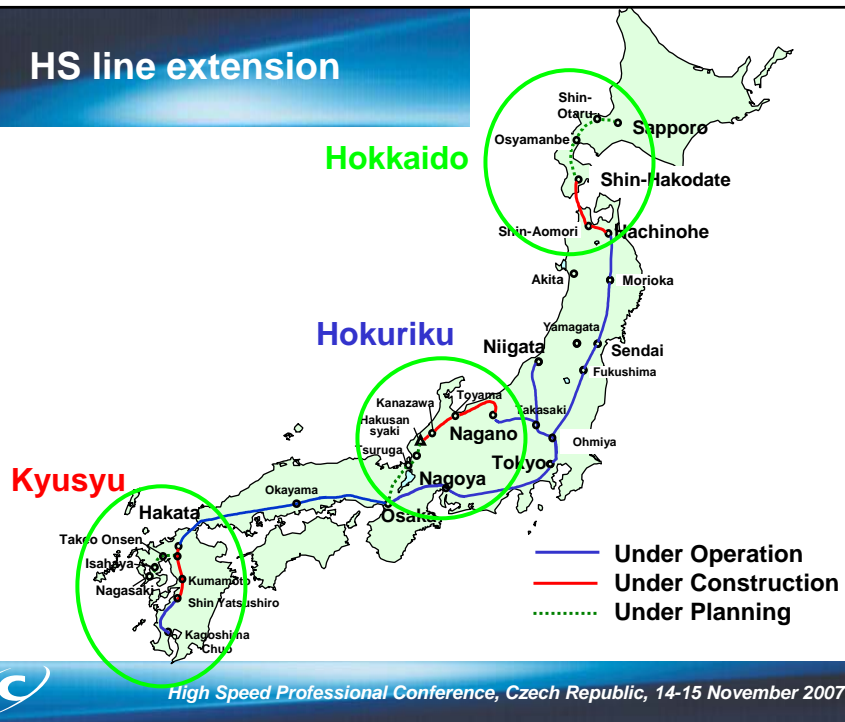


FASTECH 360



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HS line extension



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Thank you very much
for your attention



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